THE

ELECTRICAL WORLD

A REVIEW OF CURRENT PROGRESS IN ELECTRICITY
AND ITS PRACTICAL APPLICATIONS

VOLUME LXIII

JANUARY 3 TO JUNE 27, 1914

McGraw Publishing Co., Inc.
239 West 39th St.
New York City

INDEX TO VOLUME LXIII

GENERAL INDEX

Entries from the Digest of Current Electrical Literature are indicated by D (Digest)

A

Accident prevention in power plants. By J. B. Douglas, *101; R. T. McIntosh, *552
——Wisconsin conference on safety rules, 694
Accidents, Electrical. By S. Jellinek, (D.) 557
——Mine accidents. By K. Schroeder, (D.) 1406
Accounting:
——Depreciation as affecting valuation and fair return, 301
——Discussions by National Electric Light Association, 1322
——Missouri Public Service Commission system, 801, 857, 914, 1048
Advertising:
——Fan-telling campaign, Western Electric Co., *1121
——Motor-driven device, Electro Novelty Co., *225
——Shop and store displays, Good and bad methods, *388
Advertising by central stations:
——Adrian, Mich., Float, *320
——Boston, Show-window flatiron display, *45
——Cambridge, Ohio, "Electric Corner," *602
——Chicago, Advertisement for office building tenants, *430
——Cleveland, Ohio, Newspaper work, 205
——Columbus, Ohio, Billboards, *1103
——Davenport, Iowa, Window display, *321
——Fort Madison, Iowa, Window display, *1101
——"House Electric" of Potomac Electric Power Co., Washington, D. C., *655
——Illuminated signs on delivery automobiles, Boston, *423
——Indianapolis, Ind., Exhibit in show room, *654
——Jackson, Mich., Fixture display room, *376
——Kansas City:
Display at exposition, *94
Illuminated bulletins, *318
——Lancaster, Pa., Pamphlet on the motor and its users, 711
——Louisville, Ky., Good-will slogan, *153
——Mattoon, Ill., Window display, *655
——Menominee, Mich., Float, *93
——Milwaukee, Wis., Balloons in window in motion, *604
——New Orleans mardi gras parade, *653
——New York Edison Co., Window display cooking, *821, *933
——Philadelphia, Window displays, *989
——Providence, R. I.:
Sign on storehouse, *49
Tungsten-lamp window display, *711
——St. Louis, Mo.:
Moving flat-iron display, *490
Signboards, *1050
——Salem, Mass., *428
——Scranton, Pa., Vacuum cleaner on mule's hide, *1394
——South Bend, Ind., Carnival float, *207
——Stockbridge, Mass., Prize contest, 488
——Vicksburg, Miss., Window display of fan-and-feather snowstorm, 1251
Agriculture, Electricity in:
——California farms, 375
——Farming transmission line right-of-way, Pennsylvania Water & Power Co., 146
——Meadowbrook farm, near Leavittsburg, Ohio, Trumbull Public Service Co., *202
——Threshing, Co-operative electric, by Iowa farmers, *205; by Frank Koester, 607
Air-cored solenoids, Inductance of, Formula. By L. A. Doggett, *259; Comment, 239
Air filters for turbo-generators. By O. Gerold, (D.) 1264
Alternating-current calculations. By Karl Richter, (D.) 554
Alternating-current coils, Calculations for. Formula for inductance of air-cored solenoids, and description of tests to determine pull of electromagnets. By L. A. Doggett, *259; Comment, 239
Alternating-current diagrams, Representation of power in. By F. M. Denton, (D.) *555
Alternating-current supply in New York City, History of. Station of United Electric Light & Power Co., at 201st Street and Harlem River, *307, *365; Comment, 294
Alternating-current waves, Fourier method of analysis. By F. W. Grover, (D.) 276
Aluminum, Conductivity of and heat treatment. By H. Gewecke, (D.) 107
Aluminum rectifier, Potential differences between electrodes. By C. W. Greene, (D.) 1112
American Economic Association, Annual meeting, Discussion of public utility questions, 28, 82
American Electric Railway Association, Midyear meeting, 302
American Electrochemical Society, April meeting, 748, 930, 986
American Institute of Electrical Engineers:
——Affairs, 577, 1211
——Annual business meeting, 1137
——Detroit convention, 1202, 1474
——Discussion on the use of electricity in mining operations, 927
——Engineering data and handbook, 469
——Ithaca section, Annual dinner, 186
——Joint meeting with American Physical Society, 856, 972, *1045
——Joint meeting with electrochemical and mechanical engineers, January, 130
——Lynn section, Meeting, 240
——Midwinter convention in New York, 26, 355, 469, 534, 649
——Pacific Coast convention, 969
——Philadelphia meeting, 356
——Pittsburgh section, 408, 863
——Pittsfield meeting, 1080, 1291
——Washington meeting, 856, 972, *1045
American Institute of Mining Engineers, Convention in New York, 352
American Physical Society, April meeting, 856, 972, *1045
American Railway Engineering Association, Convention, 687
American Society for Fire Prevention, Organization, 410
American Society of Civil Engineers:
——Annual meeting, January, 1914, 120
——Report and discussion on public utility valuation methods, 805
American Society of Heating and Ventilating Engineers, Annual meeting, 185
American Society of Mechanical Engineers:
——Minneapolis meeting, 1472
——Philadelphia meeting, 356
——St. Paul meeting, 1280
American Telephone & Telegraph Co.:
——Annual report. "Telephone as a monopoly," 640; Comment, 629
——Litigation with government settled, 744
American Water Works & Guarantee Company, Reorganization, 746
Ammeters:
——High-frequency, Experimental investigation of. By J. H. Dellinger, (D.) 665
——Hot-wire quick-reading ammeter. By W. H. Eccles, (D.) *946
Ampere-hour meter and storage battery. By R. C. Lanphier, 213
Anchor, "Never-Creep," *1462
Anglo-American Exposition, London, 243
Anti-trust legislation (See Trusts and monopolies)
Applied electrical science in 1913. By A. E. Kennelly, 6
Appraisals (See Public service corporations)
Arc-lamp bracket and cross-arm, Chicago, *394
Arc lamps:
——Developments of 1913. By P. S. Millar, 18
——Electrodes:
Ayrton patent, (D.) 885
Difference between pure-carbon direct-current lamp and flame-arc lamp. By Mollenkopf, (D.) 497
——Double-electrode, Excello. By J. Schmidt, (D.) 385
——Instantaneous candle-power of alternating-current lamps, Measuring. By J. Sahulka, (D.) *385
——Rating lamps. By Justus Eck, (D.) 554
Arc welding (See Welding, Electric arc)
Arkansas Association of Public Utility Operators, Convention, 1029
Architect, Co-operation with the engineer, 409
Arcs:
——Extinguishing method and its application to switches and interrupters. By W. Burstyn, (D.) 55
——Helping the air currents to extinguish arcs, *215
——Musical electric arc, Water model of. By W. Duddell, (D.) 663
Armature banding with sheave blocks, *1503
Armature circulating currents in lap-wound multipolars. By C. C. Hawkins, (D.) 722
Armature reaction in direct-current machines. By R. H. Taber, (D.) 385
Armature winding with two commutators, (D.) 1353
Artillery electrician-sergeants, Work of, 103
Association of Edison Illuminating Companies, 1428
Association of Iron and Steel Electrical Engineers, Pittsburgh section, 804
Association of Railway Electrical Engineers, 1428
Associations, Conflicting dates of meetings. By H. S. Cooper, 213
Atmosphere, Electrification of. By Sir Oliver Lodge, (D.) 498, 725
Atmospheric electric observations on ocean air, 1150
Atoms:
——Forces between atoms and chemical affinity. By J. J. Thomson, (D.) 1458
——Model of the structure of the atom. By E. R. Lyon, (D.) 1001
——Structure of. By W. Peddie, (D.) 556; E. Rutherford, 1447
——Structure of the atom and spectra of the elements. By J. W. Nicholson, (D.) 1000
Automobile batteries:
——Philadelphia, *336
——Standardization of dimensions and impediment to development. By E. J. Mudge, 314
Automobile brake, Electric emergency, *335
Automobile business of central stations:
——Atlanta, Ga., 263
——Chicago. By J. F. Gilchrist, 151
——Discussions at Boston convention of electric vehicle interests, 1205
——Future possibilities. By Dr. C. P. Steinmetz, 1318
Automobile charging set, Westinghouse, *1509
Automobile engineers discuss electrical subjects, New York City, 132
Automobile gear shift, Electric, Cutler-Hammer, *729
Automobile horn, electric, *1411
Automobile lighting:
——Axle-driven dynamo in combination with storage-battery. By Emil Dick, (D.) 104
——Combination tail and license-number lamp, *222
——Exhibits at New York show, 72
——Generator, Ward Leonard, *1118
——Matisse lamp, *394
——Power requirements. By B. F. Bailey, 374
——Progress. By A. Armagnet, (D.) 105
——United States Light & Heating Co., Equipment, *109, *279
——Ward-Leonard lamp, Nodaz, *336
——Westinghouse equipment, *1411
Automobile radiator heaters:
——Dubilier, *617
——Edison, *668
Automobile starting equipment:
——Exhibits at New York show, 72
——Rushmore, *1067
——United States Light & Heating Co., *109, *279
——Westinghouse, *1411
Automobile steering wheel, Electrically heated, *168
Automobile-tire pump, Electric, *62
Automobile tire vulcanizer, Electric, Shaler, *891
Automobile transmission unit, *281
Automobiles, Electric, Pleasure:
——Boston automobile show, 616
——Charging plugs, Standard, *242
——Detroit roadster, Fast time, 1434
——Detroit seven-passenger, *1005
——Developments of 1913. By W. P. Kennedy, 23
——Discussion at Boston convention of electric vehicle interests, 1205; at Cape May convention, *1480
——Ford light, low-priced machine, 128; Comment, 125; by J. H. Hertner, 435; H. G. Overbeck, H. H. Skinner, 882; Comment, 855; Frank Steffner, 1108
——Future of the electric car, Prediction by Dr. Steinmetz, 241; Comment, 1469
——Garaging costs, 489
——Low-priced (See above, Ford)
——Tire question, 465
——(See also Trucks, Electric)
Automobiles, Gasoline:
——Electric steering, 457
——Electrical equipment of foreign, 112
Auto-transformers. By Lee Hagood, (D.) *1063
Avery-Loeb Co., Columbus, Ohio, Business methods of, *1009

*Indicates illustrated articles.

269791

B

Bakeries (See Industrial plants)
Ball, W. J., *1479
Battery charging set, Rotary converter, Lincoln, *502
Bavaria, Electrical supply in. By F. Gebele, (D.) 836
Behrend, B. A. Mr. William Cooper—An appreciation, *549
Bell companies (See American Telephone & Telegraph Company)
Bells, Transformer, P. R. Mfg. Co., *60
Big Creek development (See Transmission plants)
Blast furnace, Handling raw materials at. By J. E. Johnson, (D.) 218
Blasts, Ground current as causes of premature, *160
Boiler-efficiency recording meters, Blonck, *113
Boiler-room efficiency, Increasing. By C. M. Rogers, 1403
Boiler-room practice, Developments. By W. F. Durand, 16
Boilers:
——Brickwork and high CO_2 ratios, 1503
——Economical working of steam plants, 1352
——Economy in flat arches for fire-box service, 1109
——Feed-water purification, 1456
——Fuel losses due to excessive draft, 1109
——Quick-firing arrangement, to relay water-power. By B. W. Dennis, 212; John Hunter, 494
——Saving 1 lb. of coal per kw-hr, 1403
——Tests with Illinois coal by National Tube Co. By Bryant Bannister, 496
——Turbine cleaner for fire-tubes, Lagonda, *1409
——Visual load indicator, *217
Bonds (See Financial)
Bookkeeping for electrical contractors. By W. J. Ball, 1188
Book reviews:
——Allgemeine Elektrotechnik Hochschul-Vorlesungen. By P. Janet, 1266
——Alternating Currents and Alternating-Current Machinery. By D. C. and J. P. Jackson, 725
——Annuaire de l'Electricite, 837
——Annuaire pour l'An 1914, 833
——Chronique Illustree du Concours International de Telegraphie Practique, 613
——Conservation of Water. By Walter McCulloh, 666
——Cost Reports for Executive as a Means of Plant Control. By B. A. Franklin, 278
——Descrizione di una Macchinetta Elettro Magnetica. By Antonio Pacinotti, 387
——Deutscher Kalender fur Elektrotechniker, 613
——Einfuhrung in die Elektrotechnik. By Otto Nairz, 166
——Electric Interlocking Handbook, 278
——Electrical Engineering. By C. V. Christie, 108
——Electrical and Magnetic Calculations. By A. A. Atkinson, 666
——Electrical Engineering Problems. By F. C. Caldwell, 1459
——Electrical Meters. By C. M. Jansky, 557
——Electricity for the Farm and Home. By Frank Koester, 557
——Elektrischen Metallfadenglühlampen. By C. H. Weber, 1002
——Elektrizitat und Volkswohlfahrt. By A. Raps, 778
——Elementary Theory of Alternate-Current Working. By G. L. Hall, 888
——Elements of Electrical Engineering. By L. J. LaCour and O. S. Bragstad, 947
——Factory Lighting. By C. E. Clewell, 333
——Factory Organization and Administration. By Hugo Diemer, 1407
——Formulae and Tables for the Calculation of Alternating-Current Problems. By Louis Cohen, 1064
——Freileitungsbau-Ortsnetzbau. By A. Kapper, 613
——Gas and Fuel Analysis. By A. H. White, 500
——Gas Power. By C. F. Hirshfeld and T. C. Ulbricht, 666
——Graphs in a Cable-Ship Drum Room. By E. Raymond-Barker, 1115
——Halsey's Handbook for Machine Designers and Draftsmen. By F. A. Halsey, 1266
——Handbook of English for Engineers. By W. O. Sypherd, 166
——Handbook of Technical Instruction for Wireless Telegraphists. By J. C. Hawkhead, 1002
——Hirsch-Viking Elektro-Ingenieur Kalender, 1914, 1002
——Hydraulic Turbines. By R. L. Daugherty, 778
——Insulation and Design of Electrical Windings. By A. P. M. Fleming and R. Johnson, 443
——Investigating an Industry. By William Kent, 1355
——Jahrbuch der Elektrotechnik. By. Dr. Karl Strecker, 557
——Laboratory Manual: Direct and Alternating Current. By C. E. Clewell, 443
——L'Annee Electrique Electrotherapique et Radiographique. By F. de Cournelles, 837
——Light, Radiation and Illumination. By Paul Högner, 333
——Lighting Book. By F. L. Godinez, 221
Book reviews: (Continued)
——Maschinen und Apparate der Starkstromtechnik. Ihre Wirkungsweise und Konstruktion. By G. W. Meyer, 1407
——Metal Statistics for 1914, 1184
——Mica. By Hans Zeiller, 57
——Moderne Beleuchtungswesen. By H. Lux, 837
——Molded Electrical Insulation and Plastics. By Emile Hemming, 837
——Overhead Electric Power Transmission. By Alfred Still, 57
——Photo-Electricity. By A. L. Hughes, 1459
——Practical Uses of the Wave-Meter in Wireless Telegraphy. By J. O. Mauborgne, 947
——Price of Inefficiency. By Frank Koester, 1115
——Primer of the Internal-Combustion Engine. By H. E. Wimperis, 333
——Problems in Alternating-Current Machinery. By W. V. Lyon, 947
——Progress de la Chimie en 1912, 221
——Public Utilities. By H. V. Hayes, 888
——Reader of Scientific and Technical Spanish. By C. DeWitt Willcox, 613
——Recent Physical Research. By David Owen, 166
——Resistance of the Air. By G. Eiffel, 725
——Surtensions dans les Distributions d'Energie Electrique et les Moyens d'en Prevenir les Inconvenients. By I. Van Dam, 387
——Switchboard, Switching Protective Apparatus. By C. C. Adams, 1115
——Taschenbuch für Monteure Elektrischer Beleuchtungsanlagen. By Gottlob Lux and C. Michalke, 613
——Telephone Cables. By J. C. Slippy, 221
——Theorie Moderner Hochspannungs-Anlagen. By A. Buch, 387
——Transformer Practice. By W. T. Taylor, 500
——Where and Why Public Ownership Has Failed. By Yves Guyot, 1507
——Wireless Telegraphy. By C. L. Fortescue, 500; W. H. Marchant, 1507
——Wireless Telegraphy and Telephony. By C. R. Gilson, 443
——Work, Wages and Profits. By H. L. Gantt, 1355
——Workmen's Compensation and Industrial Insurance Under Modern Conditions. By J. H. Boyd, 1355
Booster-control test on Metropolitan Railway, Paris. By Charles Jacquin, *312
Booster system, Storage-battery, (D.) 1406
Boron, Ballast characteristics of, when used in voltage control, 1098
Boston:
——Annual dinner of engineers, 578
——Electric Motor Car Club, 241
——Electric vehicle dinner, 521
——Emergency assembly test by Boston Edison Co., 95
Bracket hardware, Barnes & Kobert, *729
Brakes, Electromagnetic, Calculation of, for cranes and hoists. By E. Schwarz, (D.) 886
Brakes, Prony, Electrically controlled. By N. C. Johnson, *216
Brakes, Railway, German electric. By C. Rossinsky, (D.) 835
Brass, Electric resistivity of. By E. F. Northrup, (D.) 611
Brooklyn Edison Electric Illuminating Co., Dinner to contractors, *395
Brush discharge in solutions, Exerimental investigation. By H. Smith, (D.) 1506
Brush-holder construction. By J. O. Girdlestone, (D.) 610
Brushes for traction motors. By G. B. Barham, (D.) 834
Buenos Aires, Subway in. By E. E. Wachsmann, (D.) 1264
Buffalo Electric Show, 520, 579, *672
Buildings (See Central stations; Office buildings)
Bureau of Standards, Relation of, to public utilities and public service commissions. By E. B. Rosa, 30; Comment, 1
Bushings for outlet boxes, Multi Refillable Fuse Co., *1358
Business, Psychology in, 1425
Business conditions in California, 859
Business regulation, competition and price-cutting. By F. P. Fish, 353
Byllesby, H. M., on public questions, 802

C

Cable burn-out caused by mice. By J. J. Skelly, 268
Cable car, Aero, *280
Cable clamps, Matthews, *1357
Cable covering for underground work, Werths, *840
Cable signaling (See Telegraphy, Submarine)
Cables (See Wires, wiring and conduits)
California business conditions, 859
California Commission news, 304, 473, 581, 752, 865, 1033, 1091, 1211, 1383, 1483
Canada. Tax of central stations in Ontario, 916
Capstans, Electric driving of. By A. Rasmussen, (D.) *1113
Carboy rocker, *1410
"Carnegie" magnetic-survey yacht completes trip, 914
Castings, Electric steel. By C. A. Hansen, 931
Catalogs, Standard sizes of. By Arthur Haller, 494
Cathode disintegration in a vacuum tube. By A. M. Tyndall and H. G. Hughes, (D.) 664
Cathodic detectors, (D.) *778
Central station business:
——Akron, Ohio, Personal service department, 1102
——Bay City, Texas, Growth, 426
——Boston:
Connected load campaign, 1394
Playlet in salesmanship course, 427
——Brenham, Texas, Staff organization, 1395
——Brooklyn:
Christmas display, *44
Edison shop anniversary, *1251
——Buying business. By S. M. Kennedy, 878
——Cambridge, Mass.:
House-wiring campaign, 953
Long-hour burner in jeweler's window, *46
——Canton, Ohio, New activities, 879
——Chicago:
Electric Shop sales, 562, 896
Factory lighting campaign, *489
Increase in business, 820
Information bureau, 375
Renewal of tungsten lamps, 1054
——Cleveland, Ohio:
Appliance clearing sale, *1070
Business-getting campaigns, 1346
Sales organization, Methods of handling, *44
Trouble department methods, *997
Wiring prices, 895
——Columbus, Ohio:
Co-operative store, *765
Lighting suggestions for customers, 712
Motorcycle repair men, 823
Training of salesmen, 1101
Wiring campaign, Flat rate, 824
——Complaining customers, 1497
——Cooking as an off-peak load, 488
——Co-operation by individuals. By M. J. Wolf, 300
——Co-operation with the manufacturer and the contractor. By P. L. Miles, 524
——Cost of generation reduced by supplying power for traction. By Thierbach, (D.) 105
——Courtesy a necessity in company subordinates, 94
——Davenport, Iowa, Co-operative threshing by Iowa farmers, *205
——Dawson Springs, Ky., Small town service from flour mills, 205
——Dayton, Ohio, "Hooking Up" wired houses, *603
——Denver, Colo.:
Long-hour lighting methods, 828
Service for private plants, 263
Washing machines and vacuum cleaners demonstrated from house to house, *653
——East Liverpool, Ohio, 428
——Effectiveness in organization. By J. P. Jackson, 580
——Elyria, Ohio, Slogan sign, 428
——Emergency cabinet for line department, 1500
——Emergency service for lumber mill, *375
——Engines, Displacing. By S. M. Kennedy, *877
——European cities, Furnishing of electricity to poorest inhabitants. By S. E. Doane, *1157; Comment, 1133; Supplement
——Fort Madison, Iowa, Slogan brings business, *934
——Fort Worth, Tex., Encouraging evening reading, 1448
——Free lamp renewals, 391
——Furnace, Electric, as a load builder, 824
——Garages, Tire pumps in, 488
——Hartford, Conn., Lamp renewal prices on the wall, *824
——Ice manufacture (See Refrigeration)
——Illinois Northern Utilities Co., Service for small towns, 94
——Indianapolis, Ind., Co-operation with supply men, 1361, *1463
——Individual drive would have saved money, 876
——Information bureau, Work done by, 375
——Installation records, *1452
——Kansas City:
Cooking tests, *207
Monthly payments for wiring, 318
Window lighting campaign, 210
——Kokomo, Ind., New business development, 321
——Lamp trade, Evils in, 524
——Lexington, Ky., "Electric Cottage," 988
——Lima, Ohio, Low wiring prices boost service, 93
——Load-factor building, Methods of increasing business and providing diversified service through extensive and intensive development. By S. M. Kennedy, *424; Comment, 406
——Lorain and Elyria, Ohio, Unified service, 255
——Los Angeles, Proposed contracts with power companies, 296
——Louisville, Ky.:
Appliance campaign, 1050
Fan service, Free, 1496
Record for six months, 764
Unified service, 205
Wiring campaign, 209, 1103
——Manager's graphic report to board of directors, *206

*Indicates illustrated articles.

Central station business: (Continued)
——Marshalltown, Iowa, Results of house-wiring campaign, 1412
——Massillon, Ohio, Coffee with lighting bill receipt, 654
——Menominee, Mich., New business methods, *98
——Merchandising and advertising, Report of National Electric Light Association, 1321
——Meridian, Miss., Daylight peak load due to motor load, 1497
——Metered versus unlimited service to office building tenants, 934
——Milwaukee, Chart showing power used for display lighting, *152
——Minneapolis:
Christmas tree outfits loaned, 151
New Year's pledge, 152
——Minnesota town of 1500 population, Two years' work, 429
——Montreal:
Appliance sale room, *1394
Conditions, 1413
——Muncie, Ind.:
Flatiron sales, 1448
Motor-service business, 1496
——Muskogee, Okla., Growth, 375
——New Britain, Conn., Clock dial to show increase in customers, *603
——New business methods discussed by Ohio Electric Light Association, 909; at Cleveland conference, 1346
——New Orleans, Wall cabinets in unwired houses, 490
——New York City, United Electric Light & Power Co., 311
——Non-peak business and high load-factor, Report at National Electric Light Association, 1319
——Ohio new-business men meet in convention in Toledo, 523
——Palmer, Mass., Harvesting ice with electricity, *96
——Philadelphia Electric Co., *1230
——Pittsfield, Mass., Rewards for prospective customers, 207
——Portland, Ore., Competition in, 1282
——Power-factor adjustment, Economies of. By H. B. Dwight, *708; Comment, 682
——Profit sharing in small plant, 711
——Providence, R. I., Narragansett Electric Lighting Co.:
Annual report, *1103
Appliance sales for, 1913, 1077, 1103
Development of business in 1913, 1103; Comment, 1077
——Reading, Pa., Ice-making load, 93
——Real estate office as a lighting customer, 822
——Refrigeration (See Refrigeration)
——Relations between supply dealers, contractors, jobbers, manufacturers and central-stations, 388, 390
——Removing obstructions to business. By S. M. Kennedy, *877
——Rochester, N. Y., Committee idea in the sales department, 96
——Rockford, Ill., "Electric house," *1449
——St. Joseph, Mo.:
Record for six months, 764
Teaching customers the cost, *263
——St. Louis, Mo.:
Appliance sales, 426
Brick factory data, 654
Exchange value of burned-out carbon lamps, 543
Fan advertising, *1493
Flatiron campaign, 604, 1496
Sample-case, Salesman's "white way," *490
White-way results, 823
Wiring already-built houses, 881
Wood working plant drive, 152
——Sale of electric appliances on a proper basis, *388
——Sales department organization. By F. D. Beardslee, 1051
——Sales organization, Handling of, Cleveland, *44
——Salesman, The successful. By L. A. Ferguson, 1396
——Salesman's "white way" sample case, *490
——San Diego, Cal., Extensions, 263
——Shreveport, La.:
Flatiron campaign, 1497
Tags discouraging waste of electricity, 1252
——Sign selling, Getting down to "brass tacks," 206
——Small cities, Securing business in. By H. G. Bonner, 523
——Small customers, European practice in relation to. By S. E. Doane, 193
——Small versus large quantity purchases of electrical supplies, 264
——Suggestion, Influence of, 653
——Tactful relations with customers. By J. W. Ferguson, 712
——Toledo, Ohio:
Co-operative wiring campaign, 1008
Electrical residential suburb, *766
Finding market for waste products, 824
Group appliance campaign, 672
Sign business, *988
——Tulsa, Okla., Co-operation with contractors, 1361
——Union City, Ind., Boosting heating appliances through women's clubs, 95
——Venice, Cal., 318
——Waco, Texas, Co-operation with contractors, *1188

Central station business: (Continued)
——Warren, Ohio:
Commercial methods, 197
No customers too small, 876
New offices, *1346
——Westerville, Ohio, Municipal plant closed, 934
——Wiring of existing buildings, Report of National Electric Light Association, 1320
——(See also Advertising; Automobile business).

Central-station practice:
——Accident prevention in power plants. By J. B. Douglas, *101
——Birmingham, England, (D.) 886
——Boiler tests in English railway stations, (D.) 835
——Bristol, England, (D.) 886
——Centralization of energy supply. By Samuel Insull, 917; Comment, 909
——Combined gas and electric plant, Laclede Gas Light Co., St. Louis, Mo., *921; Comment, 910
——Condition of plant, Suggestions, 1456
——Cooling exciter by motor driven blower, 329
——Cost of electricity at the source. By H. M. Hobart, 537; Comment, 518
——Cost of installing and operating various systems, 986
——Detroit, Changing lighting distribution from two to three-phase, *160
——Developments in power plant machinery. By A. G. Christie, 695
——Developments in prime movers. By W. F. Durand, 16
——Diesel engine plant as adjunct to hot-water heating system, *883
——Diesel sets at isolated generating points, 496
——Distribution equipment cost on a small system, South Hadley, Mass., 431
——East Liverpool, Ohio, 428
——Economic design of a distributing system. By M. D. Cooper, 546
——Economical capacity of a combined hydro-electric and steam-power plant. By C. T. Hutchinson, 537
——Economics of water-power plants. By O. B. Coldwell, 1313
——Emergency lighting service in reserve steam plants, *439
——Engine-room space utilized to best advantage, Detroit, Mich., *101
——Exhaust steam, Preventing waste of excess. By A. E. Anderson, *941
——Feeder reactance. By F. C. Barton, (D.) 836
——Gas-engine, Warren, Ohio, Trumbull Public Service Co., 197
——Gas power plant at Pont-à-Vendin, (D.) 1353
——Kansas City, Mo., Converting an operating frequency changer from two-phase to three-phase, *608
——Large cities, Comparison of. By G. Klingenberg, (D.) 55; Comment, 2
——Losses by leakage of steam. By R. T. Strohm, 1402
——New York City, United Electric Light & Power Co., *307, *365; Comment, 294
——Oil-fired furnaces for peak load operation, Kansas City, Mo., *383
——Oil-fuel plants, Management of. By R. T. Strohm, 437
——Ontario Hydro-Electric Power Commission, Interruption of service, 297
——Operating methods in large steam power plants, Discussions at American Society of Mechanical Engineers, 719
——Paris, Unification of electric supply, 187
——Philadelphia Electric Co., *1213
——Power-factor adjustment, Economies of. By H. B. Dwight, *708; Comment, 682
——Protection against dangerously high voltage. By H. Gewecke, W. Prehm, (D.) 999
——Protection of moving belts and gears, East Pittsburgh, Pa., *161
——Protective reactances in large stations. By James Lyman, A. M. Rossman and L. L. Perry, 470
——Rehabilitating station at Alliance, Ohio, *977; Comment, 965
——Safeguarding the rear of a switchboard, *162
——Salem, Mass., Automatic starting of exciter turbine, *495
——Stoker engine, Regulating valve controls speed of, *1260
——Storage batteries. By T. Milton, 711
——Synchronous converters at sixty-cycle, Cleveland, 688; Comment, 682

Central stations:
——Alabama Power Co., *1243
——Alliance, Ohio, Reconstruction and rearrangement of plant, *977; Comment, 965
——Attendantless plant, Greenfield, Mass., *812, 1403
——Austria, Statistics, (D.) 776
——Berlin Electricity Works, Development of. By E. Schiff, (D.) 1062
——Big Creek development, Pacific Light & Power Corporation, *33, *85; Comment, 1, 71; By A. J. Bowie, Jr., 493; D. P. Robinson, 493
——Calgary Power Co., Kananaskis Falls, Alberta. Extension of system, *809; Comment, 797
——Central Georgia Power Co., *1240
——Centralization of energy supply. By Samuel Insull, 917; Comment, 909

Central stations: (Continued)
——Chicago Commonwealth Edison Co. Design construction and operating methods in transmission, substation and distribution departments, Work of inspection and repair, *529, 594; Comment, 517
——Columbus Power Co., *1239
——Compulsory purchase of British stations, (D) 1062; Comment, 1023
——Constantinople, Proposed, 317
——Co-operative control in Germany. By R. A. Chattock, (D.) 106
——Denmark, Statistics. By R. J. Jensen, (D.) 776
——Detroit, Mich., Compact arrangement of engine room, *101; Conners Creek plant, 1481
——Eastern Michigan Edison Co., Loop system, *146
——French hydroelectric stations, (D.) 331
——Georgia Railway & Power Co., *1239
——Germany:
Co-operative control. By R. A. Chattock, (D.) 106
Growth, 126. By Thierbach, (D.) 1062
Statistics. By Georg Dettmar, (D.) 105; Comment, 1471
——Great Britain, Statistics, (D) 164, 385, 611
——Greenfield, Mass., Operated without an attendant, *812
——Hauto, Pa., Lehigh Navigation Electric Co., Use of unmarketable coal for generation. Water stored for condensing purposes, *1035; Supplement, *1093; Comment, 1079
——Iowa station statistics, 1052
——Kansas City, Kan., Combination power plant and pumping station. Economies effected, *643
——Kansas City Railway & Light Co., Improvements, *262
——Laclede Gas Light Co., St. Louis, Mo., Combined gas and electric plant, *921; Comment, 910
——Lewiston-Clarkston Improvement Co., Clarkston, Wash., Steam and hydroelectric system, *701; Comment, 681
——London, Bulk electric supply, Compulsory purchase of stations, 967, 971, 1021, 1023. By Merz and McLellan, 1030; (D.) 1062; Haydn Harrison, 1390; Comment, 1375
——Lorain and Elyria, Ohio, Unified electric service, Power plants, transmission lines and commercial methods, *251; Comment, 237
——Los Angeles aqueduct power plants, Million a year offered for power, 912
——Louisville Traction Co., Steam station. Coal storage. Intakes for water from Ohio River, *475; Comment, 458
——Manager's graphic report to board of directors, *206
——Menominee (Mich.) & Marinette (Wis.) Light & Traction Co. Development of properties during last 25 years. Hydro-electric plant, transmission and distribution systems, *139; Comment, 127
——Mexico, Operation under difficulties, *860
——Municipal electric light stations of the United States, Statistics, 687
——New England central station statistics, Tables, 74; Comment, 69
——New York, United Electric Light & Power Co. Station at 201st Street and Harlem River. History of alternating-current growth in New York, *307, *365; Comment, 294
——New York's oldest private plant, 262
——Ontario, Tax on stations, 916
——Paris systems, 187, (D.) 1353
——Philadelphia Electric Co.:
System, *1213; Comment, 1199
World's largest generating set, *983
——Private ownership makes for progress, Comparative data for Commonwealth Edison Co. and 300 British plants. By R. F. Pack, 749
——Providence, R. I., Annual report of Narragansett Electric Lighting Co., 1103
——Public Service Corporation of New Jersey, Annual report, 803
——Public Service Electric Company, of New Jersey, *1329
——Refrigeration (See Refrigeration)
——Richmond, Va., Development of a historic water-power. By J. M. Purcell, *867; Comment, 854
——St. Maurice-Lausanne, Switzerland, Transmission plant without a switchboard. By Louis Bell, *583; Comment, 575
——Salmon River Power Co., New hydroelectric plant, *1385, *1437; Comment, 1374
——San Joaquin Light & Power Co., Bakersfield, Cal., Extension of plant, *91
——Savannah (Ga.) Electric Co., Riverside station. Description of turbine station, *755; Comment, 742
——Shanghai, Statistical data, (D.) 1182
——Sheffield, Eng., Development of power system, (D.) 776
——Small three-phase station. By C. F. Weiland, (D.) 1000
——Southern interconnected high-tension transmission plants, *1235
——Southern Power Co., *1241
——Springfield, Mass., Proposed municipal lighting plant, 857
——Statistics for the central states, Growth of the industry, 1204

*Indicates illustrated articles.

Central stations: (Continued)
——Statistics on output of six large generating stations, 73
——Statistics of the United States. Figures of the Census Bureau for 1912 with comparisons for 1907 and 1902, by states and geographical sections, 586; Comment, 573, 630
——Stevens Creek plant, Completion, 408
——Switzerland, Statistics, (D.) 331
——Tennessee Power Co., 1236
——Warren, Ohio, Trumbull Public Service Co., Steam, hydraulic and gas-engine stations, *197
——Washington Water Power Co., Spokane, Wash., *971
——Worcester Electric Light Co., Construction progress, 912
——(See also Hydroelectric developments)
Centralization of energy supply. By Samuel Insull, 917; Comment, 909
Chafing-dish set, Westinghouse, *1119
Charging for electric energy:
——Boston, Meter hearing, 461
——Chicago:
Electric vehicles, 490
New rate schedules, 602
Street lighting, 461
——Cincinnati franchise negotiations, 184
——Cleveland, Proposed reduction of three-cent maximum rate, 639, 973, 1025, 1280
——Discussion of rates. By H. S. Cooper, 326; W. A. Smith, 658; H. D. Jackson, 659
——Electric service, energy and charges. By C. E. Wendell, 99; P. R. Moses, 324
——European cities. Cheap wiring schemes. Poorest inhabitants served. By S. E. Doane, *1157; Comment, 1133; Supplement
——Factors determining a reasonable charge. By M. E. Cooley, 356
——Flat-rate schedule with an active-room element, Jackson, Miss., 1449
——Garage battery-charging system. By D. M. Simpson, 1351
——Los Angeles rates, 968
——New Orleans municipal plant, 461
——Oklahoma rates and revenues, Table, 1252
——Rate-making for central stations. By W. H. Winslow, 12
——Rate research committee report, National Electric Light Association, 1306
——Rates dependent on the power factor. By R. Arno, (D.) 497
——Residence rates. By H. H. Seabrook, (D.) 440
——St. Paul, Minn., Rate investigations, 686
——Southern California Edison Co., 694
——Springfield, Ill., Effect of changes, 426
——Systems of charges for energy, Details of. By L. C. Tomlinson, 830; R. S. Hale, 1156; W. M. Stempel, 1400; A. H. Seabrook, 1454
——Value-of-the-service theory, Discussion at N. E. L. A. convention, 1277
——What the service will bear. By H. B. Sweet, 325
——(See also Purchased energy)
Chicago:
——Automobile show, 240
——Christmas tree decoration, *28
——Commonwealth Edison Co.:
Annual meeting, 461
Engineering department, 1102
New building, 369
Testing laboratories, *39
——Electrical distribution (See Central stations)
——"Home-Rule" question, 463
——Sanitary district, Controversy over cost of electrical energy, 237, 244
——Subways and terminals, B. J. Arnold on, 243
——Underwriters' Laboratories, Label service. By A. R. Small, 806
Christmas tree decorations, Chicago, *28
Cigar lighters, Electric, for automobiles, Asch, *113
Circuit breakers:
——Opened by break in motor-field circuit, 217
——Prevention of accidental operation of remote-controlled, *327
——Whistle-alarm attachment, *52
Clamps:
——Automatic boltless strain, *893
——Hickey & Schneider transmission line, *615
——Machen & Mayer loom and cable clamp, *504
——Matthews boltless guy clamp, *671
Cleaning iron and steel by electricity, 53
Clearing house, Louisville electrical, 1412
Cleveland Electrical Exposition, 578, 1210
Clock, Electrically illuminated, in floor, *992
Coal, Illinois, Boiler tests with, by National Tube Co. By Bryant Bannister, 496
Coal bunker, 30,000-ton subaqueous, Kansas City, Mo., *214
Coal burner for powdered coal. By G. A. Roush, (D.) 55
Coal-cutting and loading machine, Jeffrey motor-driven, *1006
Coal:
——Storing soft coal with ventilating ducts, *998
——Unmarketable coal used for generating electricity at Hauto, Pa., *1035; Supplement, *1093; Comment, 1079
——Wetting coal in stoker hoppers, *1456
Coffee urn, Simplex electric, *1066
Coils. (See Alternating-current coils)
Coin handling machine, Sattley, *670
Columbia University, Anniversary of first electrical engineering course, 1280
Commutation, Armature field. By K. A. Pichelmayer, (D.) 944
Commutation phenomena. By Alfred Still, *1442, *1489; Comment, 1425
Commutator slotter, Alley, *781
Concentration of sulphide ores, Electrostatic. By H. C. Parmelee, (D.) 56
Concrete:
——Effect of electricity on reinforced. By K. Lubowsky, (D.) 219, 278
——Electrolysis in. By E. B. Rose, Burton McCollum and O. S. Peters, (D.) 277; Comment, 238
Condenser lifts water from the sump, 941
Condenser machine for electro-therapeutic and Roentgen-ray work. By H. Wommelsdorf, (D.) *384
Condensers:
——Adjustable condenser with law of squares. By W. Duddell, (D.) *556
——Air, Variable capacity. By G. Seibt, (D.) 1459
——Charging two condensers in parallel and discharging in series. By W. H. Eccless, (D.) *836
——Grease in condensers. By R. T. Strohm, *1110
——Largest surface-type, ever constructed, Philadelphia, *983
——Status of, in connection with steam-turbine plants. By A. Josse, (D.) 1404
——Steam-turbine condenser types. By A. R. Smith, (D.) 945
Conductivity of metals, Electric. By W. F. G. Swan, (D.) 777
Conductors. (See Wires, wiring and conduits)
Conduit bushing, Fullerton metallic, *58
Conduit threader, *281
Conduit wiring machine, *558
Conduits. (See Wires, wiring and conduits)
Connecticut Get-Together Club, 1026
Connection of exciter, rheostat and field circuit, 496
Connections, Flexible-cable, for carbon brushes, *58
Conservation. (See Hydroelectric developments)
Constant-current transmission. (See Transmission)
Contact for flash-lamp case, Beacon, *1272
Contracts and contractors:
——Bookkeeping methods. By W. J. Ball, 1188
——Boston, Co-operation with central-stations, 895
——Brigham City, Utah, Caliber of contractors, 618
——Buying advertising space from contractors, 1274
——Cleveland, Ohio, Co-operation with central-station, 895
——Cleveland Women's Exposition, 730
——Competition between dealer, contractor and central station. By C. L. Eidlitz, 450
——Co-operation of contractors, 189
——Co-operation with central stations. By J. F. Ramier, 562; P. L. Miles, 673
——Co-operation with dealers and the central station, Dayton, Ohio, 449
——Co-operation with fire prevention bureaus, 353
——Denver to license electrical contractors, 1069
——Discussion at Electrical Supply Jobbers' Association, 410
——Estimators, Varieties of, 506
——Guarantee, Need of, 506
——Humor and pathos of electrical contracting. By J. A. Fowler, 618
——Indiana convention, 1300
——Indiana electrical credit men, 618
——Indianapolis, Sanborn Electric Co., Merchandizing and contracting, *783
——Kansas City, Examination board for electricians, 1463
——Legislation affecting electrical contractors, 730
——Licensing of contractors, 188
——Looking forward to a good year. By W. W. Low, 449
——Louisville, Ky., Electrical contrators adopt open shop system, 1463
——Merchandising and the new idea, 1069
——New England contracting business, 895
——Pettingell-Andrews Co., Boston, Mass., store of, *951
——Qualifications of the electrical contractors, 449
——St. Louis company guarantee work of contractors, 449
——Sales methods and stock arrangements, Cleveland, *842
——Separate contracts for electrical work essential, 506
——Service versus price in contracting, 1069
——Shortcomings of supply leaders, contractors, jobbers and central stations in marketing goods, *388
——Street lighting, Elements of. By S. D. Way, 464
——Window displays, Toledo, Ohio, *842
——Wisconsin convention, Discussions, 189; Comment, 181
Control desks, Westinghouse sectional type, *667
Control of starting resistance for wound rotor motors, Automatic, *773
Controllers:
——Automatic, for steel mill, *1409
——Flat-rate, "Extralight." By H. Stafford Hatfield, (D.) *331
——Salmon River Power Co., *1437
Converters:
——Rotary, British patents, (D.) 554
——Sixty-cycle synchronous at Cleveland, 688; Comment, 682
——Synchronous, Improvements. By J. L. Burnham, (D.) 385
Cooking, Electric:
——Advantages of. By F. S. Grogan, 664
——Battleship "Texas," *1099
——Canadian need of moderate-priced electric range, 296
——Cost, at Romano's restaurant in London, (D.) 386
——Great Britain, Progress in, (D.) 835, 886
——Hotpoint reflector type glowing stove, 890
——Marine service. By H. J. Mauger, 1391
——Olston range, *335, *1273
——Sales department dinner, *1345
——Simplex range and heater, *448, *669, *1359
——Simplex utensils, *1270
——Tests in Kansas City, Kan., *207
——Various details. By J. W. Haine, (D.) 1264
——Worcester, Mass., Apartment house ranged, 856
Cooling tower, Twin forced-draft, *1007
Cooper, William, Obituary. By B. A. Behrend, *549
Copper:
——Electrochemical extraction of ore on large scale. By E. A. Cappelen-Smith, 932
——Electrolytic refining practice. By Lawrence Addicks, 130
——German rules, for conductors, (D.) 1000
——Leaching and electrolytic precipitation in Chile. By E. A. Cappelen Smith, (D.) 1183
——Purifying copper, British patent, (D.) 1063
——Resistivity measurements. By Dr. E. F. Northrup, 219; Comment, 182
Copper tubing for radiators, Electrolytic production of perforated, Feldkamp process, (D.) 107
Cranes, Electric:
——Boston Navy Yard, 1153
——Calculating regulating resistances in the lowering operation. By E. Schwartz, (D.) 497
——Tunnel crane of 100 tons, Grand Central Terminal, *1268
Cross-arms, Iron semi-circular, Specialty Device Co., *224
Crystal rectification. By A. E. Flowers, (D.) 499; Comment, 459
Curling iron, Electric, *558
Current-limiting reactance coil, Westinghouse, *446
Current-limiting reactors on large power systems. By K. M. Faye-Hansen and J. S. Peck, (D.) 944
Cutouts, D. & W oil fuse, *1270

D

Dams across navigable rivers, Bill in Congress regulating, 1026, 1377
Delta rays from gases. By Norman Campbell, (D.) 220
Detroit, Changing lighting distribution from two to three-phase, *160
Detroit Improvement Association of contractors and supplymen, 395
Diesel engine plant as adjunct to hot-water heating system, Busch-Sulzer Brothers Diesel Engine Co., *883
Digging post holes with dynamite, *329
Direct-current transmission. (See Transmission, Constant-current)
Discharge, Electric, from liquid points. By John Zeleny, (D.) 556
Dishwasher, Electric, *1359
Disk heater, Simplex electric, *1359
Distribution. (See Transmission)
District of Columbia Commission news, 137, 975
Ditch silt transferred with electric dredge, *1396
Doherty Operating Co.:
——Annual convention, 801
——Ohio organization, 520
Domestic uses of electricity. By A. W. Hardigan, 1254
Drills, Electric:
——Chicago Expansion Bolt Co., *949
——Improvements, (D.) 55
Drills:
——Percussion-type, Electric Tachometer Co., *559
——Portable, Standard Electric Tool Co., *779
——United States, *728
Drive anchor, Universal, *1004
Dust, Electrification produced during the raising of a cloud of. By W. A. D. Rudge, (D.) 945

E

Economics and esthetics. By E. F. Roeber, Comment, 910
Eddy-current losses in sheet steel. By J. D. Ball and W. E. Ruder, (D.) 1061
Edison battery. (See Storage batteries)
Education:
——Corporation industrial and vocational schools. Testimony of Dr. Steinmetz and Arthur Williams, 1379
——Engineering departments of Harvard University and Massachusetts Institute of Technology merged, 128

*Indicates illustrated articles.

Education: (Continued)
——National Association of Corporation Schools, Convention proceedings, 1431
——New held for engineering universities, 317
——The new learning. By F. C. Wells, 1057
Electric Clearing House of Louisville, 856
Electric shock, Test of endurance of, Accentuation of pain at the cathode, 1153
Electric Vehicle Association of America:
——Chicago section, 241, 1025, 1081
——Convention, 1081
——Moving-picture films, *1280
——New England section, 93, *188
——Report on parcel-post delivery, 1203
——Standard charging plugs and receptacles, *242
——Washington section, 632
Electric vehicle convention at Boston, Proceedings, 1205
Electric vehicles. (See Automobiles, Electric; Trucks, Electric)
Electrical apparatus, Developments in. By C. F. Scott, (D.) 440; Report of National Electric Light Association, 1310; Comment, 1278
Electrical Contractors' Association of Westchester County, 1463
Electrical code proposed in Wisconsin, 521
Electrical Development Society, Sign showing emblem, *1361
Electrical engineering and modern industry. By C. P. Steinmetz, (D.) 500
Electrical industrial growth in 1913. By T. C. Martin, 4.
Electrical Jobbers' Association, Investigation, 353
Electrical science in 1913, Applied. By A. E. Kennelly, 6
Electrical Supply Jobbers' Association, Meeting, 410, 1081
Electrician-sergeants, Work of artillery, 103
Electricity in competition with gas, 799
Electrification of railways. (See Railways)
Electrification produced during the raising of a cloud of dust. By W. A. D. Rudge, (D.) 945
Electro-analysis. By D. F. Calhane and T. C. Wheaton, (D.) 332
Electrochemical possibilities of St. Louis, 857
Electrochemical processes, Electric equipment for. By F. D. Newbury, 131; Comment, 126
Electrochemistry:
——Discussion at American Electrochemical Society, 930
——Progress in 1913. By E. F. Roeber, 22
Electrodynamics, Equations of. By H. R. Hasse, (D) 219
Electrolysis:
——Chicago, Prevention in, 595
——Concrete, Electrolysis in. By E. B. Rosa, Burton McCollum and O. S. Peters, (D.) 277; Comment, 238
——Corrosion of iron in soils and destruction of pipes by stray currents. By Burton McCollum and K. H. Logan, (D.) 441
——Joint national committee, 748
——Springfield, Ohio. By E. B. Rosa and Burton McCollum, (D.) 275; Comment, 239; Test of system, 652
Electrolytic deposition of metals. Power problems in. Discussion by Lawrence Addicks, H. E. Longwell and F. D. Newbury, 130; Comment, 126
Electrolytic detectors. By Paul Jegou, (D.) *443
Electrolytic hydrogen meter. By H. Stafford Hatfield, (D.) *1406
Electromagnetic puzzle, 1442
Electromagnetic waves, Transmission of. Through and around the earth. By G. W. O. Howe, (D.) 165
Electromagnets:
——Calculation of tractive force of lifting magnets. By Paul Kalisch, (D.) 105
——Characteristics of alternating-current. By C. R. Underhill, *981; Comment, 966
——Design. By E. Iasse, (D.) 1001
——Design of bell-shaped. By Karl Metzler, (D.) 610
——Winter warning concerning, 101
Electrometallurgy of iron and steel. By W. McA. Johnson, (D.) 612; S. Guggenheim, (D.) 1458; Humbert and Hethey, (D.) 1458
——(See also Furnaces, Electric)
Electrometers:
——Simple meter. By W. H. Eccles, (D.) 946
——String. By Theo. Wulf, (D.) 724
——Szilard, (D.) *1265
——Vibration. By H. Greinacher, (D.) *166, 1459
Electroplating machine, Munning-Loeb, *1268
Electro-therapeutic bureau of New York Edison Co., *990
Elevator controller, Cutler-Hammer alternating-current, *889
Elevator limit switches, 1260
Emanations of thorium and actinium, Transformation of. By P. B. Perkins, (D.) 1114
Empire State Gas and Electric Association meetings, 240, 352, 969, 1480
Employees:
——Apprenticeship courses of Siemens-Halske, (D.) 57
—— olumbus, Ohio, Co-operative benefit association, 653
——Compensation acts in various states, 909
——Co-operation essential in conciliation, 1259
——Indianapolis, Ind., Tea room for women, 543
Employees: (Continued)
——Industrial disease a personal injury under Massachusetts compensation act, 576
——Insurance, Philadelphia Company of Pittsburgh, 912
——Inter-departmental information among, 821
——Labor exchange proposed, 969
——Northern Illinois Public Service Co., Welfare work, 1378
——Pensions:
Baltimore, 822
Northern Illinois Co., 318
——Profit sharing in small plant, 711
——Safety first reminders in pay envelopes, 765
——Safety rules, Wisconsin conference, 694
——Strikes possible in coal regions, 237
——Training salesmen, Columbus, Ohio, 1101
——Welfare work, St. Louis, 264
Engineering societies, Growth of the national, 73
Engineers:
——Business training. By Henry Hess, 409
——Compulsory registration of, in Austria. By G. Dompieri, 435
——Consulting engineers and manufacturers. By William McClellan, 717
——Co-operation with the architect, 409
——Members of commissions. By A. C. Humphreys, J. W. Lieb, J. E. Sague, N. Carlton and George Gibbs, 143; Comment, 125
——Training in public speaking necessary, 463
Engines:
——Corliss in Lytton Building, Chiago, *1356
——Four-cylinder triple-expansion, American, *779
——Lock for ignition engines, Johns-Manville, 779
——(See also Gas engines; Oil engines)
Etching numbers on glass meter cases, 103
Europe, Handling the small consumer in. Statistics from continental cities showing how electricity for domestic purposes is furnished to the poorest inhabitants. By S. E. Doane, *1157; Comment, 1133; Supplement
Exchange of surplus energy. (See Transmission)
Exhaust steam, Preventing waste of excess. By A. E. Anderson, *941
Expansion joint, Steel, for high-pressure service, Alberger, *1267
Exports, Electrical:
——Advance in export trade. By L. W. Schmidt, (D.) 1459
——Canada to the United States, 73
——Figures for 1913, 573
——Fluctuating returns, 797
——Slack period, 349

F

Factories. (See Industrial plants)
Fans, Electric:
——Automobile novelty, *892
——Diehl ball-bearing bracket oscillating, *109
——Robbins & Myers, *728
Farming. (See Agriculture)
Fee, H. A., *1477
Feed-water purification, 1456
Feeder protective gear, Ferranti-Waters, (D.) *1405
Feeder reactance. By F. C. Barton, (D.) 836
Ferro-magnetic mixtures, Magnetic properties of. By C. Benedicks, (D.) 1406
Ferromanganese, Electrically melted, Practice in European plants, (D.) 1265
Financial:
——Bond salesmanship, Compensation for, 629
——Cost of money for California utilities, 1087
——Holding companies. (See Trusts and monopolies)
——Investments in public utilities and how held, 972
——Limits on the rate of return, 1021
——Maintenance of retail prices, 797
——Oklahoma rates and revenues, 1252
——Reasonable returns. By H. Erickson, 1477; Comment, 1470
——Relative stability of public utility financing. By W. W. Freeman, 11
——Selling bonds directly to private investors, Third Avenue Ry., 517, 573
——Stock without par value. By W. H. Winslow, 191; Comment, 181
Fire-alarm sending and indicating apparatus, Guide, *392
Fire-box arches, Economy of flat, 1109
Fireproof electrical devices. By C. K. Lee, 434
Fireproofing cables, *943
Fire pump connection at Ford Motor Co., Chicago, 430
Fire truck, Saving with battery-driven, New York, 153
Flatirons, Electric:
——Automatic temperature control, Dover, *1460
——Fluting attachments, Simplex, *1185
——Rating of, 562
Flue gases, Removing cinders from, New York Edison Co., *1311
Food, Cold storage of. By S. F. Walker, 878
Foot-warmer rugs, Electrically-heated, Simplex, *114
Foreign Trade Convention, Washington, D. C., 1136, 1301, 1373
Forest Products Exposition, Chicago, *1186
Foundries, Power in. By A. E. Richards, (D.) 945
Franchises, Limited-area, Bill to abolish, in Kentucky, 576
Free lamp renewals. (See Central-station business)
Freight terminal congestion and its solution, 972
Frequencies, Standardization of. By C. W. Stone, (D.) 664; Comment, 630
Frequency changers, Commutators as. By H. Meyer-Delius, (D.) 54
Frequency meter, Hartmann & Braun. By Konrad Gruhn, (D.) *276
Furnaces, Electric:
——Annealing furnace, *1508
——Cascade attachment to graphite furnace, Use of. By E. F. Northrup, (D.) 1354
——Different furnaces and the development of the electric-steel process. By S. Guggenheim, (D.) 1458
——High-temperature laboratory furnace using artificial graphite. By E. F. Nothrup, (D.) 56
——Laboratory, the "gran-annular." By Zay Jeffries, (D.) 612
——Oil-fired, for peak load operation, Kansas City, Mo., 383
Fuse-testing machine, Automatic. By H. G. Dorsey, *1348
Fuses:
——Metropolitan repulsion type, *167
——Refillable, Western inspectors favor, 408
——Starting for induction motors, Size tables, 378

G

Galvanometers:
——Ballistic constant of moving-coil, Determining. By P. E. Klopsteg, (D.) 665
——Convection instrument. By W. H. Eccles, (D.) *886
——Moving-coil, devised by André Onwood, (D.) *332
——Moving coil, Obtaining critical damping. By P. E. Klopsteg, (D.) 556
——String, Analysis of motion of. By R. Forester, (D.) 499
Gamma rays. By E. Rutherford and H. Richardson, (D.) 56
——Rays from polonium, radium and radio-actinium. By A. S. Russell and J. Chadwick, (D.) 220
——Rays from uranium products. By H. Richardson, (D.) 498
——Secondary gamma radiation. By D. C. H. Florance, (D.) 555
Garages:
——Chicago, Charges, 490
——Cost of upkeep and energy, 489
——Private, Structure, 1496
——Tire pumps, Electric, 488
Garbage disposal plant, Electrically operated, San Francisco, Cal., 875
Gas battery. By Karl Siegel, (D.) 331
Gas engines:
——Cyclic changes of temperature. By Coker and Scovle, (D.) 105
——Warren, Ohio, Central station service, 197
Gas in vacuum tubes, Investigation of. By George Winchester, (D.) 1183
Gas power plants:
——Laclede Gas Light Co., St. Louis, Mo., Gas and electric plant combined, *921; Comment, 910
——Pont-à-Vendin, (D.) 1353
Gas producer, Smith up-draft, *560
Gas producer plant, Jacobsen, *668
Gas versus electricity. By J. G. Newbigging, (D.) 776; 799
Gases, Magnetic susceptibility. By W. P. Roop, (D.) 220
Gasoline cars. (See Automobiles; Trucks)
Gasoline mantle street lamps, Photometric tests, Philadelphia, 915
Geissler tubes, Form of electric discharges. By Millochau, (D.) 165
General Electric Co., Annual report, 913, 965
Generating plants. (See Central stations; Industrial plants; Mines; Office buildings)
Generation of power using unmarketable coal, Hauto, Pa., *1035; Supplement; *1093; Comment, 1079
Generators:
——Air filters. By O. Gerold, (D.) 1264
——Armature circulating currents in lap-wound multipolars. By C. C. Hawkins, (D.) 722
——Armature reaction in direct-current machines. By R. H. Taber, (D.) 385
——Armature winding with two commutators, (D.) 1353
——Calculation of direct-current machines. By L. Isambert, (D.) 663
——Commutation losses of direct-current machines. By L. Dreyfus, (D.) 999
——Connections in generators, Relative merits of star and delta. Discussions at American Institute of Electrical Engineers, 1291
——Conversion of a single-phase generator into a motor, *1262
——Crypto variable frequency machine, *336
——Development of the alternating-current generator in America. By B. G. Lamme, (D.) 440
——Edison bipolars in service 28 years, *1346
——Field distortion and commutation in a modern dynamo, Investigations. By A. Mauduit, (D.) 1061

*Indicates illustrated articles.

Generators: (Continued)
——General Electric engine-driven three-wire direct-current, *670
——Heating of machines. By O. Szilas, (D.) 104, 163
——Heating of pipe-ventilated machines. By A. Gray, (D.) 330
——Heyland commutator machines, (D.) 274
——High-frequency alternator for radio-telegraphy, Bouthillon. By A. M. Taylor, 128
——Induced emfs. By L. Barbillion, (D.) 440
——Iron losses. By J. Fischer-Hinnen, (D.) 330
——Polyphase commutator machines for high speed and low frequency. By Verdurand, (D.) 1353
——Resistor for shunting series-field coils, 1060
——Short-circuit current waves, Characteristics of theoretical. By F. D. Newbury, (D.) 945
——Suppression of the third harmonics. By R. J. Jensen, (D.) *1505
——Temperature in intermittent operation. By L. Isanbert, (D.) 440
——Testing of alternators, (D.) 56
——Three-phase synchronous machine, Development of the circle diagram. By T. F. Wall, (D.) 1505
——Three-phase turbo-generators, American. By Robert Pohl, (D.) 554
——Three-wire, Newton patent, (D.) 999
——Turbo-alternators at Philadelphia, Largest ever built, *983
——Turbo-generator, Westinghouse one-kw lighting unit, *168
——Variable-speed dynamos, British patents, (D.) 944
——Ventilation, Wet filtration of cooling air. By D. A. Hackett, (D.) 775; Comment, 743
——Ventilation of rotating electrical apparatus. By R. E. Gilman, (D.) 885
——Voltage drop, Gradual, when running at full load, 721
——Voltage regulation of alternators. By A. E. Clayton, (D.) 1112
——(See also Motors)
Georgia Commission news, 752
Germany:
——Central station growth, 126
——Central-station statistics. By Georg Dettmar, (D.) 105; G. Siegel, (D.) 834; Comment, 799
——Co-operative control of central-station properties. By R. A. Chattock, (D.) 106
——Electric supply for Eastern provinces. By Bartel, (D.) 885
——Electrical industry in 1913, (D.) 778, 835, 888, 945, 1115
——Lamp output in 1911 and 1912. By F. Fasolt, (D.) 54, 104
——Municipal and private ownership combined, (D.) 835
Gin-pole wagon for erecting concrete poles, Baltimore, *492
Glarimeter for measuring glaze of paper. By L. R. Ingersoll, *615; Comment, 631
Glaze of paper, Measuring. Theory and construction of the glarimeter. By L. R. Ingersoll, *645; Comment, 631
Gold dredge, Electric. By Gardner and Shepard, (D.) 1062
Governors' messages to legislatures, 129
Graphite, Metallized, 1272
Great Britain:
——Electrical trades unions. By R. W. Weekes, (D.) 557
——Electricity supply in large cities. By G. Klingenberg, (D.) 55; Comment, 2
Grill, Electric, Rutenberg cast-aluminum, *279
Grinders, Portable electric, Standard Electric Tool Co., *779, *1509
Ground, Measuring the resistance of a. By M. LaSalle, (D.) *724
Ground wires, Principle of. By E. Pfiffner, (D.) 999
Grounded neutrals in transmission systems. By Jollyman, Downing and Baum, 1279, 1293
Grounded transmission systems. Service continuity in. Methods tried by Peninsular Power Co., Iron Mountain, Mich. By M. H. Collbohm, *870; Comment, 855
Grounding device, Lord, *615
Grounding of secondaries:
——Discussion in Oklahoma, 1141
——Report by National Electric Light Association, 1313
Gyroscope in marine work, 1470, 1472, 1475

H

Hall effect, Electromagnetic phenomena relating to. By E. P. Evans, (D.) 498
Hammers, Electric, American Electric Tool Co., *168
Hammers, Electromagnetic. By L. Schueler, (D.) *1404
Harvard University, Engineering department merged with that of Massachusetts Institute of Technology, 128; By B. Lee, 270
Haulage outfit, Motor-driven gas-engine, *214
Headlamps, Esterline electric, *1067
Heat-storage apparatus, Electric, Hässler, *224
Heaters, Electric:
——Glue heaters, Advance, *950
——Redglo radiant, *110
——Regulator for hot plate, (D.) *164
Heaters, Electric: (Continued)
——Rutenber range and toaster, *727
——Soldering iron, *334
Heating, District:
——Discussions by National District Heating Association, 1295
——Residence loads and costs, 553
——Springfield, Ill., Hot-water system, *1179
Heating, Electric:
——Great Britain, Progress in, (D.) 835
——London, Progress in, (D.) 886
——Marine service. By H. J. Mauger, 1391
——Methods and costs, 943
Heating sealing wax apparatus, *1116
Heating trolley cars. By O. Stegemann, (D.) 1062
Hoists, Electric:
——Advantages over steam or air hoist. By K. A. Pauley, (D.) 885
——Automatic control of motor, *609
——Operation from flywheel motor-generator, Control equipment, *996
——Power requirements. By W. Sykes, (D.) 723
——Quebec bridge installation, *1455
Holding companies. (See Public service corporations)
Horn, Electric factory, Holtzer-Cabot, *226
Hospital, Electric equipment, Robert B. Brigham, Boston, 369
Hotels:
——Chicago, Electric service, 879
——Combined steam and gas-engine plant, Pittsburgh, Pa., *1059
——Milwaukee, Wis., Central-station service, *319
Houston, Edwin J., Obituary notices, 518, *522; By Elihu Thomson, 523
Huertley magnifier, (D.) 108
Hydroelectric developments:
——Alabama Power Co., Issue of pamphlet to arouse public interest, 745
——Alaska, 931
——Cabin Creek Junction, Va., 1472
——California Commission's attitude, 1281
——Conserving initiative. By J. C. Parker, 994
——Federal policy, 296, 412, 464, 1430, 1473; By M. O. Leighton, 1156
——Great Falls, Potomac River, Development proposed, 684
——Idaho, National Copper Mining Co. in the Coeur d'Alene district, 204
——Kentucky coal mines, Water-power from Green River, 463
——McKinley system, Illinois River at Marseilles, Ill., 577
——Massachusetts, Hearing on regulation of companies, 686
——Massachusetts, Water power research advocated, 684
——Massachusetts Commission on Water Power Conservation, Report, 297
——Minnesota properties of Consumers' Power Co., 1482
——New York State:
Cost of living and state water power, 687
Electrical companies discuss conservation measures, 465
Governor Glynn indorses bills of State Conservation Commission, 576
Hearing on Velte-Smith bills, 525
Legislation, 296
Policy of state control, 632
Recommendations of the Empire State Gas and Electric Association, 355
——New York State Conservation Commission, Annual report, 354
——Niagara power, Hearing at Washington, 466
——Norwegian plant at Rjukan, (D.) 218
——Ontario Hydro Electric Commission:
Annual report, 685
Government aid and additional water rights wanted by, 634
——Situation. By W. B. Jackson, 13
——Southern developments, 185
——(See also Central stations)

I

Ice:
——Harvesting by electricity, Palmer, Mass., *96
——Sawing by electricity, Worcester, Mass., *427
Ice plants (See Refrigeration)
Idaho Commision news, 1303, 1383
Ignition of gaseous mixtures by electric sparks. By W. N. Thornton, (D.) 776
Illinois Commission news, 31, 83, 641, 698, 919, 1143, 1435, 1483
Illinois Electrical Contractors' Association,
——January meeting, 188
——June meeting, 1479
Illuminating Engineering Society:
——Chicago section, 299
——Cleveland section, 1080
——New York section, 858
——Officers, 970, 1377
Incandescent lamp fixtures:
——Benjamin, *1067
——Best Electric Co., *444
——Cutler-Hammer, *781, *1067, *1360
——Cutter, *559, *1271
——Detachable-bowl semi-indirect fixture, Multilux, *225
——Garrecht, extensible, *337
——Holophane, *1065
——Hoods for nitrogen-filled lamps, Cutter, *1271
Incandescent lamp fixtures: (Continued)
——Hubbell, *889, *1120, *1408, *1410, *1510
——Line Material Co., *780
——National, *1066
——Nitrogen-filled tungsten lamps, *1066
——Ohio, flexible, *504
——Ostrander, *949
——Parian glassware, 1510
——Pass & Seymour, *58, *167, *1185, *1461
——Ventilated holder for outdoor tungsten lamps, *1461
——Wallace Novelty Co., *226
——Wyllie, *1186
Incandescent lamps:
——Blackening. British patent to prevent, (D) 330
——Carbon-cobalt filament, Kanazawa patent, (D) 611
——Cathode lamps. By H. Greinacher, (D) *723
——Christmas tree bulbs, Cost of miniature, 895
——Color values (See Light, Color values)
——Coolidge tungsten, 77
——Drawn-wire filaments, British patent, (D.) 663
——Experiments. By C. W. S. Crawley and S. W. J. Smith, (D.) 1506
——"Ferrowatt" lamp, (D.) 611
——Gas-filled lamp, British patent, (D.) 54
——Half-watt lamps:
English make, (D.) 834
Fundamental principles. By H. Remane, (D.) 885
Low candlepower, German. By R. Ziegenberg, (D.) 1264
Tests of the "nitra" and the osram lamps. By H. Lux, (D.) *610; Comment, 575
——Heat generated by gas and electric lamps compared, 1461
——Improvements of 1913. By P. S. Millar, 18
——Metallic-filament, New, of peculiar arrangement, (D.) *722
——Mine lamps:
Design of. By F. J. Turquand, (D.) 663
Self-contained portable. By H. O. Swoboda, 928
——Nitrogen-filled tungsten:
Discussion at Boston, 78
Historical notes. By E. R. Knowles, 549
Investigation. Data. By H. Lux, (D.) 1457; Comment, 1426
Latest developments, 1451
Moving picture machines, Seattle, Wash., 713
Store in Boston, *768
Street lighting, Philadelphia, *893
Street lighting, Seattle, Wash., 98
Terminology: Use of name "gettered." By B. W. Mendelhall, 549
——Outer globe, Post-Glover Electric Co., *950
——Portable lamp with clamp, Mueller, *1462
——Prices for tungsten, 684
——Radiation from carbon lamps By Lummer, (D.) 54, *218
——Rating lamps. By Justus Eck, (D.) 554
——Rating of lamps in Germany, (D.) 1181; By H. Lux, (D.) 1505
——"Reflex light tubes," (D.) 1264
——Report of National Electric Light Association Committee, 1317
——Siemens & Halske patents, (D.) 944
——Signal lamps on Berlin bridges. By G. R. Nylo, (D.) 944
——Sintering tungsten for filaments, (D.) 999
——Specifications, Revised, 240
——Substitution resistances, Heins patents, (D.) 385
——Temperature distribution. By A. G. Worthing, (D.) 497
——Trenzon patent for drawing filament, (D.) 385
——Tubular horizontal, for showcase lighting, *392
——Vacuum-tight seal, British patent, (D.) 55
Independent Telephone Association of America, Chicago convention, 74, 135
Indiana Commission news, 195, 304, 415, 473, 641, 698, 751, 865, 919, 975, 1091, 1143, 1383, 1435, 1483
Indiana Electrical Contractors' Association, Convention, 1300
Induction coil, Emf delivered by, 217
Induction coil potentials. By E. T. Jones, (D.) 1000
Induction in iron conduit, 721
Induction phenomena, "Longitudinal" and "Transverse." By J. B. Taylor, 772
Induction regulators. By Zederbohm, (D.) 1353
Inductive interference (See Transmission)
Industrial and vocational schools, Testimony of Dr. Steinmetz and Arthur Williams, 1379
Industrial plants, Electric:
——Bakeries:
Denver, Colo. By F. D. Burr, *544
Philadelphia, Alternating-current used by Acme Tea Co., *773
——Braking control, Increased production with, 662
——Brick plants:
Birmingham, Ala., *668
St. Louis, Energy consumption data, 654
Variation of energy consumption with condition of clay, 713

*Indicates illustrated articles.

Industrial plants, Electric: (Continued)
——Cement factories:
Hungary. By W. Fuchs, (D.) 440
Motors in the industry. By P. M. Harrison, (D) 386
——Concrete mixer, Motor-driven, *1496
——Diesel-engine plant as adjunct to hot-water heating system, Basch-Sulzer Brothers Diesel Engine Co., *883
——Drives in workshops, Electric. By O. Pollok, (D.) 945
——Forging and stamping plant, English. By W. Spencer, (D.) 164
——Foundry of Missouri Malleable Iron Co., East St. Louis, Ill. Table of motor-applications, *766
——Glass works of Wichita Falls, Tex., *1251
——Gristmills, Energy consumption, Illinois Northern Utilities Co., *602
——Leather industry, Motors in. By A. E. Rickards, (D.) 386
——Ludlow Manufacturing Associates, Mill improvements, *817
——Machine tools, Control of large motor-driven, St. Louis, Mo., *942
——Motor applications in Minnesota. By C. W. Drake, 749
——Paper and pulp industry. By E. C. Morse, (D.) 724
——Pearl button factory, Keokuk, Ia., *488
——Problem of isolated plants. By Walter Strauss, (D.) 1405
——Rolling mill operating systems. By Wintermeyer, (D.) 835, 1404; L. Rothera, (D.) 1404
——Rolling mill at Massillon, Ohio, 580
——Sawmill at Elizabeth, La., *393
——Shaft alignment causes trouble, 1179
——Steam turbines versus gas engines for steel-mill power plants. By F. G. Gasche, 1032; T. Milton, 1400
——Sugar factories, Economy of electric power. By A. L. M. Winetraub, (D.) 164
——Transfer table for car shop, Motor-driven, *1504
——Warehouse of Park & Tilford, *265
——Woodworking plants:
Alliance, Ohio, Multiple switching of blowers, *935
St. Louis, 152
——Woolen mill in Oxfordshire, Electric drives, (D.) 776
Inspection, Electrical, Discussed in Chicago, 770
Institute of Radio Engineers, 520, 577, 1428
Instrument post, Westinghouse, *560
Instruments, Unipivot, British make, (D.) 499
——(See also their names)

Insulation:
——British patents on insulating materials (D.) 57
——Classification and characterization of molded insulation. By Emile Hemming, *761, *813; Comment, 798
——Heavy patents on insulating conductors, (D) 725
——Specification for rubber, Report of joint committee, 133
——Testing set, English, (D.) *1507

Insulators:
——Damaged by arcing in a grounded system. By M. H. Collbohm, *870
——Design, Advance in, (D.) 1354
——Design of high-tension porcelain. Mechanical, electrical and commercial considerations. Characteristics of various types. By Walter Claypoole, *872
——Deterioration of porcelain, in service, 534
——Electrose line and strain types, *59
——Flaw in insulator causes line trouble, 770
——Practical operation of suspension. By H. W. Buck, *535; Comment, 518
——Shackle, Advantages. By W. Weicker, (D.) 165
——Suspension, Distribution of voltage. By R. Rudenberg, (D.) 1000
——Suspension insulator patent, Hewlett-Steinberger, Decision, 862
International Electrical Congress, San Francisco, 1915, Publicity meeting in New York, 534
Interstate trade commission proposed, 128, 295, 299, 688, 799, 859
Investment ratio and operating ratio. By Renzo Norsa, (D.) 164
Ionic dissociation. By F. P. Worley, (D.) 777
Ionization. Energy required to ionize a molecule in collision. By J. S. Townsend, (D.) 556
Ionization in the unstriated discharge and in the arc. By C. D. Child, (D.) 555
Iowa central-station statistics, 1052
Iowa Electrical Contractors' Association, 449, 842, 1008
Iron for electrical construction, Rubel patent, (D.) 663
Iron, Magnetic testing rules, German, (D.) 1183
Irrigation in Idaho, Gem irrigation district.
Pumping plant of Crane Falls Power & Irrigation Co., Largest motor driven plant, *256; Comment, 238
Isolated plants. (See Industrial plants; Office buildings)
Italy, Statistics of the electrical industry, (D.) 835

J

Jobbers (See Contracts and contractors)
Jovian Order:
——Commercial division, Progress of 462
——Relief fund urged, 461

K

Kansas Commission news, 806
Kelvin effect. By J. Spielrein, (D.) 331
Kinematograph projector, (D.) 1266

L

Label service of Underwriters' Laboratories of Chicago. By A. R. Small, 806
Labor exchange proposed, 969
Labor unions in trust laws, 1425
Laboratories. (See Testing laboratories)
Lecher oscillator. By Blake and Sheard, (D.) 1063
Legal:
——Cost of miniature Christmas tree bulbs, 895
——Going value, Decision of New York Court of Appeals, 686
——Grasping suspended wire held to be contributory negligence, 758
——Long Acre Electric Light & Power Co., Suit dismissed, 576
——Marconi patents, 632, 800
——Radio-telegraph patents litigation, 696
——Re-sale prices, Decision preventing, 520
——St. Mary's River case, 1376
——Springfield, Ill., Contest over municipal plant, 1080
——Storage-battery wood-separator patent upheld, 301
Legislation:
——Governors' messages, 128
——National Electric Light Association's power to influence, 405
——(See also Trusts and monopolies)
Light:
——Artificial daylight, Comment on lecture by Dr. H. E. Ives, 631
——Color of, Determination. By L. Bloch, (D.) 664
——Color values, Graphical methods of representing. Maxwell's color triangle recommended. By Erich Jasse, (D.) *104; Comment, 70
——Fluorescent light, Production and properties. By W. S. Andrews, (D.) 55
——Integrating the amount of light. By H. S. Hatfield, (D.) 1459
——Invisible light of x-ray tubes and radio-active material. By W. R. Whitney, (D.) 885
——Shadows of natural and artificial light. By J. S. Dow and V. H. Mackinney, *825; Comment, 798
——Specific consumption of light sources, 162
——(See also Photometry)
Lighting, Electric:
——Amusement device lighting outfit, *890
——Automobile. (See Automobile lighting)
——Automobile station, San Francisco, *169
——Baker's oven, *1452
——Billboard, with arc lamps, *432
——Bill of fare lighted on outside wall, *1054
——Brightness. By J. R. Cravath, 1139
——Calculations compared with actual results in illumination. By W. C. Clinton, (D.) 1181
——Central station offices, Ann Arbor, Mich., *714
——Church bulletin boards, *430, *1451
——Church entrance, *267
——Clock dial in tower, Springfield, Mass., *48
——Color effects for advertising and the stage. By M. Luckiesh, *759; Comment, 742
——Counter illumination for examining negatives, *1054
——Daylight and artificial light. By J. R. Cravath, 49
——Direct-current conversion for railway lighting. By P. Ansler, (D.) *1061
——Display lighting chart for contract agents, Milwaukee, *152
——Dome of Palace of Horticulture, Panama-Pacific Exposition, *829
——Economic aspect. By H. H. Magdsick, 548
——Educating the public in good lighting practice at expositions, *97
——Factory lighting, Chicago, *489
——Farm system, Electrical Testing Co., *169
——Festival at St. Joseph, Mo., *30
——Future conditions. By H. E. Ives, 209
——Glare in illumination, 349
——Glare, Determination of. By P. G. Nutting, 1156
——Hotel dining rooms, *1356, *1451
——Ice-skating rink, Vancouver, B. C., *762
——Improvements of 1913. By P. S. Millar, 18
——Indirect:
Booth at exhibition, *151
New Orleans school, *1187
Residence lighting, *156
——Intermittent tungsten lighting, Dussaud method, (D.) 775
——Law of inverse squares and tubular light sources, *1504
——Library at Newton, Mass., *1498
——"Marble Light." By W. Voege, (D.) 722
——Modern developments. By S. E. Doane, 750

*Indicates illustrated articles.

Lighting, Electric: (Continued)
——Nitrogen-filled lamps for interior lighting, 1255
——Pageant at St. Louis, 992
——Printing office, Chicago, *492
——Progress in the science of lighting. By E. P. Hyde, 745
——Railroad station, Calculating economical arrangement. By H. Van Glinski, (D.) 497
——Residence, Methods for. By A. L. Powell, *210
——St. Louis pageant and masque, *1381
——Shadows of natural and artificial light. By J. S. Dow and V. H. Mackinney, *825; Comment, 798
——Shoe-shining shop, *549
——Showcase containing historic table, *991
——Stage lighting. By Michalke and Grillmayr, (D.) 385
——Stage lighting, Best practice. By H. H. Reeves, (D.) 944
——Stairways, Self-extinguishing lamps for, 162
——Stores:
Lord & Taylor, New York, *1145; Comment, 1134; 1397
Nitrogen-filled tungsten lamps, Boston, *768
——Street. (See Street lighting)
——Symposium. (D.) 663
——Tennis court lighted with high-efficiency lamps. By A. L. Powell and A. B. Orday, *1398
——Theater, Indirect units, *1267
——Track, scale and railroad yard, 548
——Train systems:
Twelve systems. By T. Ferguson, (D.) 663
Various systems. By C. W. Bender, (D.) 834; Jabot, (D.) 1181
Woodbridge constant voltage system, (D.) 775
——Tube lighting progress. By D. McFarlan Moore, 747
——Ultra-violet rays, Effect of on human eye. By Schanz, (D.) 55
Lightning arrester hangers, *1462
Lightning arresters:
——Aluminum-cell, Status of. By E. E. F. Creighton, 542
——Horn type, Jumping voltage. By C. Garrard, (D.) 834
——Westinghouse electrolytic, *781
Lightning protection. By L. A. De Blois, 1045
Liquid-gas surfaces, Electrification at. By H. A. McTaggart, (D.) 556
Liquid points, Electric discharge from. By John Zeleny, (D.) 556
Load-factor building on an electric system. Methods of increasing business and providing diversified service through extensive and intensive development. By S. M. Kennedy, 424; Comment, 406
Loading device for meter testing, Portable, *1359
Loading sand electrically along the Mississippi River, *264
Lock for ignition engines, Electric combination, Johns-Manville, *779
Locomotives, Electric:
——Baldwin-Westinghouse, *1005
——Butte, Anaconda & Pacific Ry., *599
——Diagrams and design data of twenty-seven different locomotives. By F. Lydall, (D.) 105
——General Electric 1500-volt direct-current, *617
——Mine:
Development. By G. M. Eaton, 928
Energized from trolley wire, Cost of operation. By F. Riep, (D.) 835
Westinghouse, *334
——Motors and control equipments. By F. Lydall, (D.) 664
——Rheatian Ry. By Hans Engel, (D.) 611
——Storage battery, three-axle, for switching purposes. By H. Schmeusser, (D.) 1113
——Towing, Panama Canal, *838
London's electricity supply, 967, 971, 1021, 1023; By Merz and McLellan, 1030; (D.) 1062; Haydn Harrison, 1390; Comment, 1375
Los Angeles, Cal., Power bond election, 1026; By E. F. Scattergood, 1258; J. A. Lighthipe, 1501; J. E. Macdonald, 1502
Louisville Electrical Clearing House Association, 1412
Louisville Electrical Contractors' Association, Offices, 506
Lubricants, Selection of. By R. L. Ellis, 1504
Luminous discharges in a magnetic field. By R. F. Earhart, (D.) 555

M

Machine tools, Device to minimize wear of, *1109
Magnetic circuits, Sheet-steel economy in. By J. G. Homan, 606
Magnetic fields:
——Effect of, on the resistance of metallic resistors. By W. A. Jenkins, (D.) 1114
——Fields of various forms and the electromotive forces induced by them. By L. Barbillon, (D.) 163, 218
——Supposed chemical decomposition of varying, (D) 441
Magnetic properties of iron when shielded from the earth's magnetism. By E. Wilson, (D.) 886
Magnetic separation of iron ore from gangue. Improved method, *1153

Magnetic-survey yacht "Carnegie" completes trip, 914
Magnetic susceptibility of water. By H. C. Hayes, (D.) 1114
Magnetic tests of iron and steel:
——ast steel and cast iron. By H. Schübbe, (D.) 612
——Differential testing method. By J. F. Van Lonkhuizen, (D.) 887
——German rules for testing sheet iron, (D.) 1183
——Zickler method of testing sheet iron. By F. Goltze, (D.) 56
Magnetism, Mechanical effect of. By S. R. Williams, (D.) 107
Magnetization, Effect of, on opacity of iron to Roentgen rays. By A. H. Forman, (D.) 1183
Magneto testing device, Automobile, *667
Magnets. (See Electromagnets)
Manganese steel, Magnetic properties. By Hadfield and Hopkinson, (D.) 1458
Manhole construction, Chicago, *532, *533
Manhole guard, Universal, *948
Manufacturers and consulting engineers. By William McClellan, 717
——(See also Contracts and contractors)
Maryland Commission news, 83, 305, 357, 581, 751, 865, 1483
Massachusetts Commission news, 83, 137, 305, 581, 641, 865, 1303
Massachusetts Institute of Technology:
——Engineering department merged with that of Harvard University, 128; By B. Lee, 270
——New buildings, 913
Measurement of capacity. By K. Haubner, (D.) 56
Measurement of high potentials. By C. E. Guye and A. Tcherniawsky, (D.) 442
Measurement of resistance, Absolute. By F. E. Smith, (D.) 386
Measuring idle volt-amperes. By H. B. Taylor, (D.) 442
Measuring inductances, Convenient method for. By W. H. Wilson, (D.) *1506
Measuring the real power and the wattless power in an alternating-current circuit. By Pestarini, (D.) 1407
Measuring transformer, Experimental determination of the magnetizing current. By E. Alberti and V. Vieweg, (D.) 724
Meat chopper, Motor-driven, *1461
Megohmmeter, Chauvin and Arnoux, (D.) 333
Memphis Electrical Show, *1482
Merchandising and the new idea, 1069
Mercury arc rectifiers and motor generators on arc lamp circuits, Relative economies of, 496, 833
Mercury lines, Satellites of, Anomalous Zeeman effect in. By Nagaoka and Takamine, (D.) 556
Mercury-motor watt-hour meters, Sangomo, *445
Mercury-vapor and Neon tubes combined, Claude patent, (D.) 274
Mercury-vapor and steam turbine units combined. By W. L. R. Emmett, (D.) 163, 386
Mercury vapor lamps:
——Absorption of light and arrangement to avoid it. By F. P. Kerschbaum, (D.) 944
——British patent, (D.) 1505
——Laboratory lamp, Design of. By A. H. Pfund, (D.) *1112
——Water-cooled, Quartz-tube lamp. By Billon-Daguerre, (D.) 163
Mercury vapor rectifiers:
——Development of large-capacity. By K. Norden, (D.) 163
——Hewitt and Steinmetz patents, 1472
——Improving operating performance, 383
——Long life record, Detroit municipal plant, *51
——Single-phase, Experience in German foundry. By J. Epstein, (D.) 54; Comment, 2
——Speed regulation of motors. By F. W. Meyer, (D.) 274, 384
Meter seal, Metropolitan, *1309
Meter wagon, Buffalo electric, *1007
Meters, Boiler-efficiency recording, Blonck, *113
Meters, Electric:
——Boston, Hearing at, 461
——Esterline graphic meters, *616
——Fluctuating synchronous motor load affects relative meter readings, *662
——Induction, Theory of three-phase. By M. Sieghahn, (D.) 612
——Peak-voltage, *114
——Pocket, Pignolet, *59
——Portable laboratory, D'Arsonval, *726
——Recording system, Reading, Pa., 426
——Regulations and rules in various states, 320; Comment, 293
——Report of National Electric Light Association, 1322
——Small consumers, Meters for, 1469
——Testing, General Electric, *502
——Three-phase, Erroneous readings with. By L. Schnackenburg, (D.) 221
——Top versus bottom connections, Vancouver, B. C., 936
——Transportation, Springfield, Mass., *152
——Unbalanced circuits, Meters on. By J. P. Gebelein, 606
——Westinghouse small switchboard meters, *1003
Meters, Electrolytic hydrogen. By H. Stafford Hatfield, (D.) *1406
Mexico:
——Electrical situation, 1202
——Investments in public utilities, 1028
——Power plant operation under difficulties, *860
Microphones, Oscillographic study of. By A. Blondel and S. Polak, (D.) *1184
Micropyrometer. By G. K. Burgess, (D.) 276
Mills. (See Industrial plants)
Milwaukee, Joint meeting of technical societies, March, 695
Mines, Electricity in:
——Accidents in mines. By K. Schroeder, (D.) 1406
——Control equipment. By H. P. Reed, 927
——Discussion at American Institute of Electrical Engineers, 927
——Discussion at American Institute of Mining Engineers, 410, 467
——Drilling, Electric, 468
——Excavators, Motor-driven. By H. W. Rogers, 467
——Exploding mines by wireless, 1250
——French coal mines. By J. Mathivet, (D.) 330
——Great Britain, Annual report, (D.) 275
——Lamps, Self-contained portable electric. By H. O. Swoboda, 928
——Machinery developments. By S. B. Belden, *468
——Mineville, N. Y.:
Data on operation of iron-mine plants, 996
Equipment and operating cost. By S. Le Fevre, 468
Magnetic separation of iron ore from gangue, *1153
——Mining machine, Motor-driven top cutting, Jeffrey, *889
——National Copper Mining Co., Idaho, 62
——Regulations for electric installations. Discussions at American Institute of Electrical Engineers, 863
——Regulations for mines, German, (D.) 1183
——Safeguarding the use of electricity. By H. H. Clark and C. M. Means, 467
——Signal system, Alternating-current, *608
——Signals and lamps in same circuit. Cripple Creek Mines, *1058
——Substations, Operation and maintenance of. By H. Bookler, 929
Minnesota Electrical Association, Convention, 688, 749
Mississippi Electrical Association, Convention, 968
Missouri Commission News, 1091
Missouri Electric, Gas, Street Railway and Water Works Association:
——Action on tentative classification of accounts, 801
——Convention cruise and proceedings, 1298
Missouri electrical contractors, Meeting of, 72
Missouri Public Service Commission:
——Hearing on accounts, 1048
——Obligation to investors, 1077
Molded insulations, Classification and characterization of. By Emile Hemming, *761, *813; Comment, 798
Montreal, Underground conduit developments, 1379
Moore vacuum tubes, Candle powers. By J. Buies, (D.) 330; Comment, 295
Motor control, Regenerative, Crompton-Burge patent, (D.) 945
Motor starters:
——Allen-Bradley alternating-current, *892
——Automatic. By Bruno Thieme, (D.) *776
——Cutler-Hammer, *448
——Leonard patents on compound, *91
——Location, Improper, *382
——Methods for internal combustion motors. By O. H. Wildt, (D.) 107
Motors, Electric:
——Adjustable-speed polyphase induction motor. By A. Hoeffleur and M. P. Misslin, *1247; Comment, 1198
——Blown compensator fuse, 1058
——Brushes for traction motors. By G. B. Barham, (D.) 834
——Cascade induction, Description and operation. By L. J. Hunt, (D.) 663, 775
——Cogging effect in induction motors. By H. L. Smith, (D.) 163
——Combined synchronous and induction motor loads. By F. M. Farwell, 269; G. W. Meyer, 381
——Commutation of A. C. motor with interpoles at normal speeds. By A. Mandl, (D.) 1353
——Commutation of single-phase commutator. By K. Schenfer, (D.) 330
——Crompton and Burge polyphase synchronous, (D.) 274
——Current for three-phase motor, 439
——Dental-lathe, Robbins & Myers, *1356
——Fairbanks-Morse, internal-starter, *1119
——Feeder cables, Size of, 553
——Fractional horse-power motors, Menominee, *1120
——Hunt cascade induction, Operation and windings. By F. M. Denten, (D.) 218
——Induction machine as generator and motor, 1403
——Induction, Theory of. By J. Lissner, (D.) 104
——Interlocking of motor operation, *328
——Iron losses. By J. Fischer-Hinnen, (D.) 330
——Negative stray induction coefficients in commutator. By H. S. Hallo, (D.) 330
——Open and semi-closed slots in induction motors. By Th. Hoock, (D.) 554
——Open-circuited rotor connection, 1109
——Pitting of mica between commutator segments, 998
——Polyphase commutator. By H. Meyer-Delius, (D.) 54, 384
Motors, Electric: (Continued)
——Polyphase induction, Analytical formulas. By H. Kafka, (D.) 497
——Repulsion-induction motor trouble, 1060
——Resistance divisions for series-motor operation. By E. R. Carichoff, (D.) 55
——Speed regulation with mercury vapor rectifiers. By F. W. Meyers, (D.) 274
——Split-phase starter troubles, *1401
——Starter for automobiles and motorboats, Rushmore, *1067
——Starting squirrel-cage motors. By E. Jackson, (D.) 663
——Starting-torque control, *1351
——Temperature rise of induction motor at no load, 884
——Testing induction using circle-diagram and Prony brake methods, (D.) 554
——Three-phase commutator, Design of. By J. L. La Cour, (D.) *384
——Three-phase series commutator, Use of. By Oskar Srnka, (D.) 1181
——Three-phase repulsion. By A. Heyland, (D.) 440
——Three-phase winding, Obtaining. By Max Breslauer, (D.) 999
——Transferring a motor from one source of energy to another while operating, 774
——Vehicle motors, Characteristics of saturated and unsaturated. By T. H. Schoepf, *692
——Water rheostat mechanism for operating induction, *832
——Wire sizes and starting fuses for induction motors, Tables, 378
——Wrecking of remote-controlled, Cause of, 884
Moving day peaks, Minimizing, 741
Moving-picture exhibit, Electricity in, 1376
Moving pictures for selling electric vehicles, *1280
Municipal ownership:
——District of Columbia, Movement in, 1377
——Los Angeles, Cal., 1080
——Private versus municipal ownership. By K. Pietzsch, (D.) 1406
——Springfield, Mass., Abandonment, 1136
——Wakefield, Mass., Abandonment, 1138
——Warning by W. H. Taft, 296
——Westerville, Ohio, Plant closed, 934
Mutual insurance company proposed in New York state, 970

N

National Association of Corporation Schools, Convention, 1431
National District Heating Association, Annual convention, 72, 800, 1138, 1295
National Electric Light Association:
——Accountants' section should be enlarged, 1277
——Brooklyn Company section meeting, 186
——Chicago section, Meeting, 821
——Company members, *710
——Convention:
Arrangements, 408, 632, *841, 1121
Entertainments, 1137
Notable features, 1277
Papers, reports and discussions, 1305
Proceedings, *1283; Comment, 1277
Program, 1027, 1202
——Duty to the public, 1197
——Eastern New York Section, Joint meeting with Empire State Gas and Electric Association, 352
——Educational conference, 913
——Iowa section, 800, 974, 1040
——Legislation, Power to influence, 405
——Michigan section, 686, 1138; Convention cruise, 1476
——New England section, 1136
——Residence-service campaign, 1495
——Southeastern section, 686
National electrical code, Philadelphia conference, 618
National Electrical Contractors' Association:
——Convention, 856, 1473
——Co-operation with fire prevention bureaus, 353
——Field work, 783
National Fire Protection Association, 1024, 1084
National Foreign Trade Convention, Washington, 1136, 1301, 1373
National Independent Telephone Association, Annual convention, 137, 191
Natural gas industry, Magnitude of, 802
Nevada Commission news, 358
New business (See Central-station business)
New Hampshire Commission news, 358, 1383
New Jersey Commission news, 83, 247, 304, 357, 473, 581, 698, 807, 919, 975, 1383
New Jersey Electrical Contractors' Association, Meeting, 301
New York City:
——Alternating-current growth, History of. Station of United Electric Light & Power Co. at 201st Street and Harlem River, *307, *365; Comment, 294
——Fourth-of-July illumination, 1472
——Gas and electric companies occupy a new building together, 767
New York Edison Co.:
——Electro-therapeutic department, *990
——Revenues, 1033
——Savings and Loan Association, 1481
New York Electrical Society, 521
——Bush Terminal meeting, 973
——Officers, 1381

*Indicates illustrated articles.

New York, New Haven & Hartford R. R., Bond issue overruled by Massachusetts Commission, 184
New York Public Service Commission:
——Appointments by Governor Glynn, Criticism on, 741
——News, 195, 473, 527, 698, 751, 1033, 1091, 1143, 1211, 1302, 1434
——Qualifications of commissioners, 293
New York State Electrical Contractors' Association, January meeting, 186
Niagara Falls Power Co., Annual report, 974
Niagara Power and the development of New York State water power, 184, 1081
Nickel, Conditions affecting electrodeposition. By Bennett, Kenny and Dugliss, 1401
Nitrate by electrolysis of peat deposits. By G. Darry, (D.) 107
Nitrogen-filled lamps (See Incandescent lamps)
Northwestern Cedarmen's Association, Convention, 243
Northwestern Electric Equipment Co., New building, *1274
Notation, German, (D.) 332

O

Office buildings:
——Boston, Paine Furniture Co., *153
——British post office, Electrical equipment. By H. C. Gunton, (D.) 219
——Cincinnati, Union Central Life Building, Electrical features, generating equipment and lighting systems, *417; Comment, 405
Ohio commercial men meet at Toledo, 523
Ohio Commission news, 31, 304, 473, 698, 751, 807, 919, 1033, 1211, 1383, 1435, 1483
Ohio Electric Light Association:
——April meeting, Discussion of new business topics, 917
——Committees on appraisal and uniform accounting, 1280
——July meeting, 1429
——New business co-operation committee, 800
——Special meeting, 1025
——Utilities committees, 1137
Oil:
——Cooling of turbine bearing oil, Canton, Ohio, *832
——Transformer, Requirements and decomposition phenomena. By W. Brauen, (D.) 497
Oil engines, Covington, *1005
Oil filter, Multiple-tank, gravity-system, East Liverpool, Ohio, *53
Oil fuel:
——Advantages and disadvantages of. By R. T. Strohm, 551
——Combustion. By R. T. Strohm, 272
——Purchase of. By R. T. Strohm, *660, *720
Oil fuel plants, Management of. By R. T. Strohm, 437
Oils, Cost of producing power with different, 216
Oklahoma Gas, Electric and Street Railway Association, Convention, 1141
Oklahoma rates and revenues. Table of, 1252
Omnibus, Stepless electric, *1408
Ontario Hydro-Electric Power Commission, Annual report, 685
Oregon Commission news, 975
Organization charts:
——Brenham, Tex. An ice-electric plant, *1395
——Public Service Electric Company, of New Jersey, 1332
Oscillator. Lecher. By Blake and Sheard, (D.) 1063
Outlet box fittings, Phelps, *448
Overhead construction (See Transmission)
Oxides, Thermal electromotive forces in. By C. B. Bidwell, (D.) 1001
Ozonators:
——Designs with and without solid dielectrics between the electrodes. By A. Vosmaer, (D.) 56
——Otto ozonizer for water sterilization in Paris. By P. Postel-Vinay, (D.) *498
——Ozone machines and public health. By H. A. Fee, 324; M. W. Franklin, 381
——Water ozonizer, combined with filter, Held, *393

P

Pacific Coast Jobbers' Association, 1412
Pacific Gas & Electric Co., Annual report, 1433
Paint that warns of overheated bearings. By J. P. Schroeter, 833
Panama Canal, Electric equipment, (D.) 164; By D. P. Gaillard, 1282
Panama-Pacific International Exposition, 1915:
——Civic center for conventions, *1381
——Decorative lighting, 713
——Illumination of dome of Palace of Horticulture, *829
——View, *969
——Work on Exposition, *187
Paper. (See Glaze of paper)
Paper lift, Electric, Rouse, *1509
Parcel-post service. (See Trucks, Electric, Parcel-post service)
Paring machine for vegetables, *279
Paris, Electricity supply in, (D.) 1353
Patent matters:
——Hearings on Oldfield patent bill, 912
——Oldfield bill, New, 1089
——Reforms urged at banquet of the Patent Law Association of Washington, 460
——Salaries of the Patent Office, 1140
Peak-voltage meter, *114
Pennsylvania Commission news, 473, 975, 1143
Pentane lamp as a working standard. By E. C. Crittenden and A. H. Taylor, (D.) 664
Percolator, Aluminum, Hotpoint, *561
Periodic waves, Analysis of. By L. W. Chubb, (D.) 442
Pettingell-Andrews Co., Boston, Mass., Store of, *951
Phase advancer, Kapp, (D.) *999
Phase compensator of Brown, Boveri & Co. By Neithammer and Siegel, (D.) 163
Phase compensation, Different kinds of plant available for. By G. H. Eardley-Wilmott, (D.) 1062
Philadelphia get-together meeting in May, 1140
Photochemical rays. By H. L. Heusner, (D.) 945
Photo-electric effect. By R. Pohl and P. Pringshein, (D.) 107; Fredenhagen and Küstner, (D.) 611; O. W. Richardson, (D.) 777
Photographic handy box, 656
Photographic printing machine, Stadler electric, *501
Photographs, Telegraphing, 1021; by A. Korn, (D.) 1064
Photometry:
——Definition of photometric units. By A. P. Trotter, (D.) 1457; Comment, 1426
——Flicker photometer, Use of, discussed by M. Luckiesh, 1078
——Heterochromatic photometry. By M. Luckiesh, 1105
——"Objective" photometry. By Voege, (D.) *1181, 1264; Comment, 1200
——Tests of gasoline mantle street lamps, Philadelphia, 915
Pictures, Electric transmission of, 1021. By Arthur Korn, (D.) 1064
Pin, Forged-steel, high-tension, Hubbard, *170
Pipe bending tool for conduit work, *671
Pipe cutter, Borden, *1271
Pipe taplets, Paiste, *58
Pipe thawing (See Thawing water pipes)
Pipes, Freezing of water pipes prevented by electric heating, 745
Plier for stripping insulated wire, *1508
Plugs:
——British exhibit, (D.) 275
—— utler-Hammer Plugs, *109
——Hubbell, small attachment, *558, *726
——Trumbull, *501
Poles:
——Concrete, and lamp standards, *222
Manufacture and installation by the Hydro-Electric System. Tests and costs. By J. G. Jackson, *147
Storm-proof qualities, 576
——Concrete butts. By T. H. Arnold, 491
——Fires caused by soot on insulators, 609
——Gin-pole wagon for erecting concrete, Baltimore, *492
——Protecting wooden trolley pole extensions, Kansas City, *269
——Steel, with self-contained transformer, Schweitzer, *154; Comment, 125
Post holes dug with dynamite, *329
Posts:
——Cast iron, Central Foundry Co., *169
——(See also Street lighting)
Power-factor adjustment, Economies of. Methods of securing best conditions for companies and users. Bonus system for keeping power factor high. By H. B. Dwight, *708; Comment, 682; G. W. Meyer, 1259
Power-factor indicators for variable frequency, Single-phase. By Leonard Murphy, (D.) *107
Power Sales Club, 1428
Power table, Federal electric, *1119
Prayer wheels, Motor-driven, 1447
Prices:
——Discrimination in. By G. H. Montague, 1108
——Maintenance of retail, 797
Prime movers:
——Developments in. By W. F. Durand, 16
——For electrolytic generators. By H. E. Longwell, 130
——Report of committee of National Electric Light Association, 1311
Prony brake, Electrically controlled. By N. C. Johnson, *216
Protective devices for switchboard and measuring instruments. By W. Wolf, (D.) 888
Protective resistors for high-tension oil switches. By Bruno Bauer, (D.) 1114
Psychology in business, 1425
Public ownership (See Municipal ownership)
Public policy report of National Electric Light Association, 1305; Comment, 1279
Public service commissions:
——Attack on Wisconsin Commission, 1373
——Commissioners, Valuable, should not leave office, 853
——Engineers as members. By A. C. Humphreys, J. W. Lieb, J. E. Sague, N. Carlton, and George Gibbs, 143; Comment, 125
——Pennsylvania, Powers of, 857
——Qualifications of commissioners, 293
——Responsibility of, 1077
Public service corporations:
——Attitude of conciliation. By S. M. Kennedy, 939
——Control. By J. H. Gray and others, 28
——Education and regulation, 909
Public service corporations: (Continued)
——Engineer's part in regulation. By A. C. Humphreys, J. W. Lieb, J. E. Sague, N. Carlton and George Gibbs, 134; Comment, 125
——Financing, Relative stability of. By W. W. Freeman, 11
——Future of. By T. N. McCarter, 864; Comment, 853; W. D. Kerr, 1028
——Holding companies:
Hearing on holding company feature of Newlands interstate trade commission bill, 1086
Influence of holding company on electric utilities. By A. K. Baylor, 9
Justifiable companies. By Bernard Flexner, 579; Comment, 574
Legislation, 681, 684, 801
Municipal ownership and. By Arthur Williams, F. T. Homer, 693
Value of, 1135
——Indeterminate permit, Complete regulation under. By W. J. Norton, 1298
——Legal aspects of regulation. By C. F. Mathewson, 1090
——Monopoly in public utility service, Pennsylvania decision, 965
——Politics and public utilities, 1197
——Public and the corporation. By A. S. Miller, 14; J. M. Wakeman, 212
——Public good will and central stations. By R. D. Williams, 50
——Public interest in problems, Forum for discussion suggested, 853
——Regulation according to size, 799
——Regulation discussed by Western Society of Engineers, 690
——Regulation, J. B. McCall on, 1277
——Relations with the public. By R. F. Pack, 749
——Risk and public service control. By R. H. Whitten, 8
——Standardization of service. Relation of Bureau of Standards to utilities and commissions. By E. B. Rosa, 30, 79; Comment, 1
——Teaching the public, Lectures at Y. M. C. A., New York, 578; Comment, 573
——Telephone viewpoint regulation. By T. N. Vail, 7
——Valuation, Report and discussion by American Society of Civil Engineers, 805
——Wisconsin regulation law. By R. C. Disque, 695
Public utilities (See Public service corporations)
Pump for apportioning boiler compound and feed water, *215
Pumping stations, Electrically operated. By J. M. Bryant, 1254
——Boston fire service, 495
——Irrigation plant, Gem district in western Idaho, Largest motor driven plant, *256; Comment, 238
——Losses due to pipe friction in irrigation pumping. By J. E. Davidson, 707
——New York City, Fire protection system, *608
Pumps, Electric:
——Fire, Controlling equipments, 1085
——Fire, Gould two-stage centrifugal, *1358
——Inflating of automobile tires, Hartford, *1360
——Liutweiler non-pulsating, *1267
——Mine, portable, Goulds, *1357
——Wheeler turbo-air pumps, *948
Purchased energy:
——Electric railway problem. By Peter Junkersfeld, 1139
——Versus isolated plant. By Walter Straus, (D.) 1458; Comment, 1427
Pyrometers. Micropyrometer. By G. K. Burgess, (D.) 276

R

Radio-activity. Secondary electronic radiation. By A. J. Philpot, (D.) 945
Radio-elements, Valency of. By G. Hevesy, (D.) 1001
Radiotelegraphy:
——Antenna, Advantages of umbrella, 1060
——Calculation and design of transmitting station. By L. B. Turner, (D.) 666
——Calculating stations, using phenomena of primary resonance. By P. Bouvier, (D.) 1355
——Charging two condensers in parallel and discharging in series. By W. H. Eccles, (D) *836
——Design of stations, Electric calculations. By A. S. Blatterman, (D) 557, 613
——Developments of 1913. By J. L. Hogan, Jr., 20
——Discussion. By Elihu Thomson, 186
——Dubilier's apparatus, (D.) *57, 166
——Eccles' theory. By H. Parodi, (D.) 1266
——Electrolytic detector, Principles of. By P. Jegou, (D.) 387
——Frog-leg radio recorder, 1246
——Goldschmidt system. By E. Maver, 650
——Government supervision, 293, 299
——Laboratory for Bureau of Standards proposed, 684
——Magnifier, Huertley's, (D.) 276
——Marconi patents valid, 632, 696
——Masts and coils, Data on, 998
——Measurement of different quantities, various methods. By J. Erskine-Murray, (D.) 1507

*Indicates illustrated articles.

Radiotelegraphy: (Continued)
——Meteorological factors, influence of. By Paul Ludewig, (D.) 777, 888; Comment, 854
——Microphones worked in parallel. By W. H. Eccles, (D.) *946
——Patent suits by Marconi interests against National Electric Signaling Co., 696
——Patents, Review of. By W. H. Eccles, (D.) 778, 836, *946
——Polyphase currents applied to, Outline of Tests. By E. G. Gage, *1042; Comment, 1022
——Portable apparatus, Advances in design. By P. R. Coursey, (D.) 1002
——Progress in. By H. Diesselhorst, (D.) 1407; Comment, 1374
——Propagation and interception of energy. By C. A. Culver, (D.) 1115
——Propagation of electromagnetic waves. By G. R. Dean, (D.) 1064; H. Barkhausen, (D.) 1115
——Propagation of wireless waves during solar eclipse, 1250
——Recorder, Tauligne. By A. Gradenwitz, (D.) 1184
——Relay, Brown's, to reinforce current at receiving end, (D.) 165
——Relay stations. Plans of Radio Club of Hartford. By H. P. Maxim, 1057
——Resonance phenomena in high-frequency circuits, modified electrical theory. Effects on circuits. By J. Hettinger, *421, *481, (D.) 778; Comment, 458
——Review of status of receiving stations. By P. Brenot, (D.) 613
——Shock excitation. By E. Mesper, (D.) 836
——Statistics of Bureau of Census, 462
——Steamship equipment, "Imperator," (D.) 166
——Tone-wheel detector. By R. Goldschmidt, (D.) 386; Comment, 349
——Train service, Delaware, Lackawanna & Western R. R. By J. L. Hogan, Jr., *89; Comment, 70
——Transmitter, Portable Leslie Miller, (D.) *277
——Tuning of receivers. By W. H. Eccles, (D.) *946
——Wave detectors, Tests. By. P. R. Coursey, (D.) 1355
——(See also Institute of Radio Engineers)
Radiotelephony:
——Developments of 1913. By J. L. Hogan, Jr., 20
——Quenched spark experiments. By W. T. Ditcham, (D.) 277
——Railroad system, *1269
Radium emanation, Activity of freshly formed. By H. H. Poole, (D.) 1114
Rail corrugation. By S. P. W. Sellon, (D.) 664
Railless electric traction compared with tramways as to economics. By T. S. Gribble, (D.) *1182
Railways:
——Booster-control test on Metropolitan Railway, Paris. By Charles Jacquin, *312
——Butte, Anaconda & Pacific, High-voltage direct-current electrification, *599; Comment, 575
——Central station supply of energy. By Thier-Bach, (D.) 105
——Chicago, Milwaukee & St. Paul, Electrical equipment, 26
——Comparative economics of tramways and railless electric traction. By T. S. Gribble, (D.) *1182
——Constantinople, Electric traction in. By Poschenrieder, (D.) 1000; (D.) 1353
——Delaware, Lackawanna & Western, Radiotelegraph service. By J. L. Hogan, Jr., *89; Comment, 70
——Design of rolling stock, Factors affecting. By H. E. O'Brien, (D.) 776
——Direct-current distribution for service lines. By R. H. Rice, 540
——Direct-current traction, New Ward Leonard system. By M. Legouez, (D.) 1113
——Direct-current electric traction of 1200 volts. By H. J. Mulder. (D.) 776
——Electric, Statistics of the Bureau of the Census, 633
——Electric versus steam traction, Economic aspects. By L. Calisch, (D.) 164
——Electrical equipment, (D.) 55
——Electrification as affected by traffic conditions. By H. W. Firth, (D.) 1113
——Electrification of railroads. By B. J. Arnold, 27; Comment, 3
——Electrification for suburban, fast passenger and freight service. By R. T. Smith, (D.) 555
——Electrification of trunk lines. By L. A. Osborne, 159
——Great Britain, Electric railway statistics, (D.) 105
——High-tension d. c. traction, Ward Leonard motor-generator system. By P. Amsler, (D.) *1182
——Italy:
Electric traction situation. By G. Huldschiner, (D.) 1113
Verona-San Bonifacio, High-tension d. c. line, (D.) 1113
——Japan, Electrified mountain railway, (D.) 664
——Loetschberg single-phase line, (D.) 105, 497, 611
——Los Angeles & San Diego Ry., Proposed electrification, 302
——Mountain railway in Southern Tyrol. By W. Gyaros, (D.) 1353
Railways: (Continued)
——New York, New Haven & Hartford, Auto-transformer plan for reducing inductive interference, *984
——Pennsylvania:
Contracts with Philadelphia Electric Co. for energy, 26
Electrification plans, *1083
——Purchased energy for electric railways. By Peter Junkersfeld, 1139
——St. Gothard, Cost of electric equipment. By J. D. Sparks, (D.) 835; G. Brecht, (D.) 885
——Signal system actuated automatically by trains, Germany. By G. Kemman, (D.) 497
——Signaling systems. By H. M. Jacobs, (D.) 55
——Single-phase traction. By L. Gratzmuller, (D.) 165
——Stockholm, Electrification of suburban line. By F. F. Von Holmgren, (D.) 664, 723
——Sweden, Use of petrol-electric motor cars, (D.) 724
——Swedish State Ry., Electrification. By F. Zolland, (D.) 1113
——Switzerland:
Electrification. By J. Reyval, (D.) 331, 386, 440
Electrification, Report of Mr. Dinkelmann, 647
St. Gothard tunnel route. By Emil Huber-Stockar, 689; Comment, 683
Single-phase system being carried out, 519
Spiez-Brig single-phase line, (D.) 105
——Vienna street lines, Accident prevention. By Von Knapitsch, (D.) 105
——Washington, D. C., Arguments against municipalization, 1088
Ranges (See Cooking, Electric)
Rates (See Charging for electric energy)
Rational units, Quantum theory of ultimate. By Lewis and Adams, (D.) 556
Reactances:
——Current-limiting coil, Westinghouse, *446
——Current limiting reactors on the application of oil circuit-breakers, (D.) 885
——Current-limiting reactors on large power systems. By K. M. Faye-Hansen and J. S. Peck, (D.) 944
——Protection of power circuits against transient excessive currents. By E. P. Hollis, (D.) *775
——Protective coils. By E. P. Hollis, (D.) 440; Comment, 406
——Protective, in large power stations. By James Lyman, A. M. Rossman and L. L. Perry, 470
Reasonable return. (See Financial)
Recording devices for central stations, Plea for use of. By C. P. Steinmetz, 541; Comment, 517
Recording instrument, Brown continuous-chart, *447
Rectifiers:
——Aluminum, Differences between electrodes. By C. W. Greene, (D.) 1112
——Automobile battery rectifier, Wotton, *335
——Efficiency of, 496, 833
Refractory material:
——British patent, (D.) 332
——Measuring high-temperature resistivity. By E. F. Northrup, (D.) 333
Refrigeration:
——Brooklyn, Bay Ridge Ice Co., Motor-driven raw-water ice factory. By E. A. Leslie, *1485
——Calculating the size of a refrigerating outfit. By S. F. Walker, 764
——Combination ice-electric plant that is 38 per cent investment, 1252
——Combination ice-electric plant in Ohio town, 989
——Cost of ice-making, Small additional, 1251
——Florist's shop. By S. F. Walker, 823
——Ice-making returns in a Western city, 934
——Ice plant makes 24-hour electric service possible, 1345
——Ice-making rink, Vancouver, B. C., *762
——Keokuk, Iowa, Sixty-ton ice plant, *543
——Machine for household use, Johns-Manville, *61
——Mechanical refrigeration. By J. B. Joyce, Jr., 352; H. J. Macintire, (D.) 330, 611
——Motor sizes to drive machines, 1051
——Reading, Pa., Central-station energy, 93
——Small machines, the Audiffren-Singrun, 1050
——Troubles in motor-driven plant, Remedy for, *1503
Regenerative motor-control. Crompton-Burge patent, (D.) 945
Regulation (See Public service corporations)
Regulator for electric hot plate, (D) *164
Regulators, Induction. By Zederbohm, (D.) 1353
Relativity, Principle of. By Kajuro Tamaki, (D.) 275; G. Dimmer, (D.) 441
Relays:
——Differential relay for heavy work. By H. E. Dey, *1260
——Lieben-Reisz gas relay. By Lee De Forest, (D.) 778
——Protection of transmission circuits. By F. E. Ricketts, (D.) 945
——Relays and service continuity. By G. A. Bernan, 773
——Reverse-power, Condit, *559
——Reverse-power, Roller-Smith, *1272
Relays: (Continued)
——Vibrating, Invented by K. Gulstad. By W. Judd, (D.) *777
——Westinghouse inverse-time-element relays, *1068
Resistance divisions for series-motor operation. By E. R. Carichoff, (D.) 55
Resistances:
——Absolute measurement of. By F. E. Smith, (D.) 386
——Protective, in connection with high-tension oil switches. By Bruno Bauer, (D.) 886
Resistivity in trial. By T. D. Waring, 1350
Resistors:
——Meter testing outfits, Amundsen portable, *382
——Silit resistors, Manufacture and use of. By G. Egly, (D.) 945
Resonance phenomena in radio telegraphy. By J. Hettinger, *420, *481; Comment, 458
Return on investment. (See Financial)
Rheostat casing, Cast-iron, *1271
Rheostats:
——Automobile battery-charging, Ward Leonard, *1120
——Biddle compression carbon, *1068
——Calculating for direct-current motors. By L. Cachot, (D.) 104
——Review of different types. By L. Cachot, (D.) 1406
——Water rheostat, Sachers, (D.) *1000
Riveting, Cost of electric, 609
Roentgen-ray tube with pure electron discharge. By W. D. Coolidge, (D.) 220
Roentgen rays, Theory of reflection. By C. G. Darwin, (D.) 498
Rotary converter set for moving-picture theaters, Northwestern, *780
Rubber insulation committee of manufacturers and users, Report on specifications, 133
Rugs, Electrically heated foot-warmer, Simplex, *114

S

Safety (See Accident prevention)
Sag in cables (See Wires, wiring and conduit)
St. Louis pageant and masque, Electrical features, *1381
Sales departments (See Central-station business)
Salesmen (See Central-station business)
Satellites of mercury lines, Anomalous Zeeman effect in. By Nagaoka and Takamine, (D.) 556
School building, Rupert, Idaho, Electrical equipment. By T. W. Halliday, *1151
Schools, Corporation, industrial and vocational, Testimony of Dr. Steinmetz and Arthur Williams, 1379
Scott, Holton Henry, *1289
Screws, Safety set, Bristol, *838
Searchlamps:
——Adjustable electric, Wood, *1411
——Hand lamps, Niagara, *334
Selenium. Physical properties of. By P. J. Nicholson, (D.) 199; Comment on paper by G. W. White, 743
Series discharge tubes. By H. Greinacher, (D.) *612
Shade-roller measuring, sawing and boring machine, Mylod, *727
Ships, Electricity on:
——Propeller drive. By H. Peters, (D.) 945
——Steering gear, British patent, (D.) 1062
——Steering of ships. By H. L. Hibbard, 1392
——"Tarragon," U. S. motor boat, 420
Shoe repair shop, Electricity in, *208
Short-circuit current waves of generators, Characteristics of theoretical. By F. D. Newbury, (D.) 945
Sign and decorative lighting:
——Alliance, Ohio, Sign of the electric lamp, *976
——Ball game represented, *1397
——Barber post, Columbus, Ohio, *1451
——Boston, Houghton & Dutton Co., *156
——Boston hospital-fund campaign, *546
——Central station office sign, Malden, Mass., *376
——Changeable letter sign, *729
——Chattanooga, Tenn., *1511
——Chicago, Edison Co., *1498
——Church sign, Watertown, Mass., *604
——Color effects for advertising and the stage. By M. Luckiesh, *759; Comment, 742
——Commonwealth Edison Co., Indicating decreasing price, *38
——Dental sign, *1453
——Design of illuminated signs. By A. H. Ford, 1433
——Electric-service companies building, New York, *829
——Factory exterior sign, *425
——Flushing window signs, E. B. Electric Sign Co., *1409
——Fountain sign on theatre, *1348
——Fulton, Ky., Slogan sign, 490
——Garage sign, Economical, Newton, Mass., *378
——Gate sign, *657
——Gimbel's giant sign, *97
——Green Bay, Wis., Grocer's roof sign, *210
——Kansas City, Missouri Pacific R. R., *320
——Lightning stroke producing crash, *1500
——Midas electric letter signs, *949
——Miniature display signs, Deschere, *669
——Miniature-lamp letter sign, *1255
——Pittsfield, Mass., 1495
——Pueblo, Colo., Rotary Club banquet, 716
——Quebec supply house, *1511

*Indicates illustrated articles.

Sign and decorative lighting: (Continued)
——Salt Lake City, *1105
——Scranton, Pa., School sign, 209
——Searchlight illumination of building front, Philadelphia, *267
——Sign on side of chimney, Putting up with parachute, *386
——Slogans of American cities, 544
——Springfield, Ill., 488
——Store sign, Cambridge, Mass., *1054
——Warren, Ohio, *1102
Signal lamps for bringing public speakers to time, 47
Signals, Railway:
——Actuated automatically by trains, Germany. By G. Kemmann, 497, 886
——Block signal system operated by central-station energy, Chic., Mil. & St. Paul R. R., *989
——Optics of light signals. By C. O. Harrington, (D.) 1457
——Rapid transit system. By H. G. Brown, (D.) 945
——Systems. By H. M. Jacobs, (D.) 55
Silicon steel, Magnetization values of, 833
Silit resistors, Manufacture and use of. By G. Egly, (D.) 945
Silver sulphide. Electrical properties of. By F. A. J. FitzGerald, 987
Silver voltameter (See Voltameters)
Siphon condenser intake, Fallston, Pa., *52
Skin effect in conductors, Mathematical theory. By E. F. Northrup and J. R. Carson, (D.) 441
Slogan signs of American cities, 544
Smelting, Electric:
——Hardanger, Norway. By J. Harden, (D.) 332
——Zinc ore, 986
Smoke prevention by means of steam jets, 1250
Society for Electrical Development:
——Annual meeting, 1082, 1281
——Campaign prizes awarded, 744
——Chicago co-operative movement, 521
——Fund of $200,000 fully subscribed, 460
——Meetings, 240, 1082, 1281
——Window settings, *1413
Society meetings, Conflicting dates of. By H. S. Cooper, 213
Society of Automobile Engineers, 132, 1428, 1480
Solenoids. By C. R. Underhill, 1045
——Formula for inductance of air-cored. By L. A. Doggett, *259; Comment, 239
Southwestern Electrical and Gas Association, Convention, 1024; Proceedings, 1208
Spectra of the elements. By H. G. J. Moseley, (D.) 1114
Spectra of the elements and the structure of the atom. By J. W. Nicholson, (D.) 1000
Spectral lines, Effect of electric and magnetic fields on. By N. Bohr, (D.) 725
Speed counter and stop-watch, *949
Speed regulator for slip-ring induction motor, Allen-Bradley, *1462
Spot lamp, Resistance grid for, 273
Stables, Electrically equipped, Safety devices for wet rooms. By O. Heinisch, (D.) 275
Standard Gas & Electric Co., Annual report. 802
Standardization:
——Boundaries and divisions of. By F. B. Crocker, 716
——Work of the International Electrochemical Commission. By A. R. Everest, (D.) 54, 351
Standardization of public utilities service (See Public service corporations)
Starting-box troubles, *1111
Starting exciter turbine automatically, Salem, Mass., *495
Starting-torque control, *1351
Statistics of the central station industry in the United States, Figures of the Census Bureau for 1912, with comparisons for 1907 and 1902, by states and geographical sections, 586; Comment, 573
Steam, Losses by leakage of. By R. T. Strohm, 1402
Steam trap, Remedying operating trouble, *1352
Steam turbines (See Turbines, Steam)
Steel, Eutectoid transition point of carbon steels. By S. W. J. Smith and J. Guild, (D.) 665
Steel-sheet economy in magnetic circuits. By J. G. Homan, 606
Stoker engine speed controlled by regulating valve, *1260
Stone planer with electric drive, *334
Storage batteries:
——Central-station service. By T. Milton, 711
——Development of 1913. By Lamar Lyndon, 21; R. A. Bachman, 158
——Edison, Efficiency. By R. A. Bachman, 158; Lamar Lyndon, 381
——Substation equipment and experience of Chicago Commonwealth Edison Co., 597
Storage battery motor-cars. By Buttner, (D.) 885
Storage-battery wood-separator patent upheld, 301
Storms on the Atlantic coast, 520
Stoves (See Cooking, Electric)
Street lighting:
——Akron, Ohio, Magnetite arcs, 991
——America and Europe. By Arthur Williams, C. F. Lacombe, 432
——Boston:
Hearing on contracts, 1136
New contract, 685
——Cashmere, Wash., *1255
Street lighting: (Continued)
——Chicago:
Cost, 461
Nitrogen-filled lamps, 2000, 991
Sanitary District supply, 936, 1429
——Cleveland, Ohio, Suburb Shaker Heights Village, Combination trolley and lighting poles, *47
——Columbus, Ohio, Contractor furnishes festoon lighting, *783
——Combined trolley-wire support and lamp post, Cleveland, *47
——Contracts for. By S. B. Way, 464
——Davenport, Iowa, 377, *433
——De Kalb, Ill., Concrete lamp posts, 380
——Detroit, Mich., *212
——Distribution of electrical energy, 541
——Energy basis, Milwaukee, 293
——Green Bay, Wis., Cost of installing luminous-arc ornamental system, 47
——Hammond, Ind., *938
——Hartford, Conn., Nitrogen-filled lamps, 685
——Hudson, N. Y., Combination lighting posts, *48
——Indianapolis, Replacing arc lamps with nitrogen-filled tungstens, *605
——Kansas City:
From hospital plans, *268
"White Way" lighting, *377
——Lynn, Mass., *880
——Mattoon, Ill., Testing arc lamps in service, *605
——Menominee, Mich., Tungsten, *324
——Milwaukee:
Contract, 266
Energy basis, 293
Inverted flame arcs, *210
——Minneapolis, Island of Safety lamps, 267
——New York, Fourth-of-July, 1472
——Philadelphia, *1225
——Problems of the present. By J. R. Cravath, 1055; Comment, 1022
——Providence, R. I., Inverted magnetite-arc units, *936
——Red Lake Falls, Minn., 318
——Report of National Electric Light Association committee, 1316
——Richmond, Va., 369
——St. Louis:
Decorations, *548
Eads Bridge, *546
——Nitrogen lamps and concrete posts, *657
——White-way results, *823
——Seattle, Wash., Nitrogen-filled tungsten lamps, *98, 716
——South Hadley, Mass., Costs, 431
——Special assessment, 1373
——Specifications as proposed in England. By J. Abody, (D.) 1264
——Springfield, Mass., 881
——Warren, Ohio, Trumbull Public Service Co., *200
——Washington, D. C., Pennsylvania Avenue, *491
——Worcester, Mass., Luminous arcs, *1051, 1482
Street sprinkling and cleaning machine, Mossay electric, *839
Strikes, Storing coal for, 237
String electrometer. By Theo. Wulf, (D.) 724
Submarine telegraphy (See Telegraphy, Submarine)

Substations:
——Big Creek development, *85
——Chicago, 420, *530, *594
——Delta-Star outdoor, *226
——General Electric outdoor, *894
——Lorain and Elyria, Ohio, *251
——Menominee (Mich.) & Marinette (Wis.) Light & Traction Co., *143
——Organization of departments, Chicago, 595
——Outdoor versus indoor stations, Discussions at American Institute of Electrical Engineers, 471
——Philadelphia Electric Co., *1213
——Public Service Electric Company of New Jersey, *1329
——Safeguarding wires, Worcester, Mass., *432
——Small outdoor substations for rural communities. By E. B. Merriam, (D.) 834
——Training of operators, 596
Switch and receptacle outlet, Metropolitan, *447
Switch cutout and fuse for overhead lines, Metropolitan, *444
Switchboard rules, Germany, (D.) 219
Switches, Electric:
——Alarm-clock time switch, Victor, *504
——Bryant chandelier pull, *614
——Condit 4000-amp oil switch, *1003
——Condit high-voltage, *501
——Connecticut, *728
——Cutler-Hammer, *561
——End-cell, Electrical Storage Battery Co., *504
——Evolution of oil switches. By W. J. P. Orton, (D.) 219
——Ice on pole-top switches, Tests by Delta-Star Electric Co., *337
——Palmer inclosed service, *112
——Protective resistors for high-tension oil switches. By Bruno Bauer, (D.) 1114; Comment, 1077
——Rules for constructing and testing, (D.) 1183
——Staircase lighting, Landis & Gyr, *670
motors, General Electric, *614
——Starting switch for alternating-current motors, General Electric, *614
——Westinghouse selector-type disconnecting, *727
Synchroscope with recording attachment, Schweitzer & Conrad, *793
Syndicalism. By John G. Brooks, 82

T

Tachometer, Bristol pneumatic recording, *669
Tariff matters, United States bill and its relation to the German electrical industry. By H. Oestreicher, (D.) 57
Tax on Canadian central stations, 916
Teakettle, Simplex electric, *1066
Telegraphy:
——Baudot system. By A. C. Booth, (D.) 1002
——Duplex system. By R. Lopez, (D.) 276
——Germany, Development. By O. Arenet, (D.) 386
——High-frequency alternating-currents in. By A. Maior, (D.) 499
——Inductive interference, Auto-transformer plan for reducing, on N. Y., N. H. & H. R. R., *984
——Magnifier, Huertley's, (D.) 276
——Radio (See Radiotelegraphy)
——Statistics of Bureau of Census, 462
——Submarine:
Experiments in Europe, (D.) *1354
Gott system, (D.) *887
Statistics, 462
——Train dispatching, Telegraph and telephone systems compared. By M. H. Clapp, 649
——Wheatstone automatic system. By R. Lopez, (D.) 613
Telephone and telegraph disturbances (See Transmission, Inductive interference)
Telephone call meter, British, (D.) 165
Telephone patents, 49, 158, 212, 269, 324, 381, 433, 493, 549, 606, 657, 881, 938, 994, 1056, 1107, 1257, 1400, 1453, 1501
Telephony:
——Automatic telephone clock and indicator systems in Kings College Hospital, (D.) 666
——Cable laying across the Golden Horn. By A. Podmore, (D.) 600
——Call system with signal lamps, Canton, Ohio, *942
——Characteristics of telephone lines. By L. Cahen, (D.) 777
——Dresden, Semi-automatic exchange, (D.) 1459
——Exchange, Traffic distribution. By J. Baumann, (D.) 499
——Government ownership of telephone lines, 298
——Harmonic relay, Miller, *1056
——Improving efficiency of telephone service. By W. Aitken, (D.) 666
——Inductive disturbances, Remedies for. By G. Girousse, (D.) 55
——Loaded and unloaded cables, Mechanical analogy of. By. J. A. Fleming, (D.) 499
——Loading with induction coils, Theory. By J. G. Hill, (D.) 333
——Locating high-tension trouble with exploring coil, 1352
——London-Birmingham-Liverpool cable. By W. J. Hillyer, (D.) 1265
——Long-distance problems. By E. F. Petritsch, (D.) 1355
——Magnifying electric currents. By E. Reisz, (D.) 556
——Measuring capacity in circuits, British patent, (D.) 221
——Mercury vapor-relay, British patent, (D.) 500
——Microphones, Oscillographic study of. By A. Blondel and S. Polak. (D.) *1184
——Munich long distance exchange. By W. Schreiber, (D.) 666
——Non-uniform lines. By Devaux Charbonnel, (D.) 442
——Oscillograph, Telephone as. By M. Siegbahn, (D.) 1459
——Prepayment telephones. By Teuffert, (D.) 221
——Relay, Lieben magnifying, (D.) 1459
——Relays, British and German experiments, (D.) *107
——Statistics of the industry, 580, 804
——Steidle system in Germany, (D.) 947
——Telegraph lines for long-distance telephony. By Bela Gati, (D.) 442
——Traffic recording machine. By W. Lee Campbell, (D.) 1266
——Traffic studies in automatic switchboard systems. By W. L. Campbell, *649
——Train dispatching, Comparison of telegraph and telephone systems. By M. H. Clapp, 649
Telewriter, Electric, Gray instrument. By C. Heckmann, (D.) 778
Temperature in electrical apparatus, Calculating heat flow. By F. D. Newbury, 1310
Temperature measurements of electric machines. By O. W. A. Oetting, (D.) 442
Tennessee Electrical Contractors' Association, Convention, 408
Terminal connectors, Meliorate Manufacturing Co., *280
Testing laboratories of Commonwealth Edison Company of Chicago, *39
Testing machine, Alligator-jaw, Albert & Anderson, *1269
Testing work of a large power company. By T. F. Whimster, (D.) 724
Thawing water pipes by electricity, 327
——Home-made outfit, *438
——Portable plant at Waukesha, Wis., *660

*Indicates illustrated articles.

Theater with movable roof, *1448
Thermal emf at the junction of metals and metallic oxides. By S. L. Brown, (D.) 1063
Thermionic currents in high vacuum experiments. By Irving Langmuir, (D.) 219
Thermo-galvanometer, New type, British patent, (D.) 1354
Thermometers:
——Calorimetric resistance. By Dickerson and Muller, (D.) 276
——Electric. By Hans Vogt, (D.) *836
Thermopile of bismuth and of bismuth-tin alloy. By W. W. Coblentz, (D.) 499
Thury system (See Transmission, Constant-current)
Tools, Portable electric, Stow, *61
Torque meter, Spring type. By H. H. Broughton, (D.) *56
Tractor, Battery-driven, Operating data, Pennsylvania Railroad, 215
Transformation:
——Leblanc system using three-phase magnetic circuit. By H. de Pistoye, (D.) 55
——Single-phase to three-phase, 53
——Three-phase to single phase, (D.) 776
Transformation of emanations of thorium and actinium. By P. B. Perkins, (D.) 1114
Transformer case, Pittsburgh pressed-steel, *614
Transformer-generator unit, Operating plan, 53
Transformer house, Ornamental, Denmark, *209
Transformer substation, Outdoor, Westinghouse, *782
Transformers:
——Changing of frequency and pressure of alternating current, Static transformers for simultaneous. By A. M. Taylor, (D.) *1263
——Concealed pole-type, Schweitzer, *154; Comment, 125
——Connection of secondaries, 774
——Connections of three-phase. By R. Swyngedauw, (D.) 723
——Connections in transformers, Relative merits of star and delta, Discussions at American Institute of Electrical Engineers, 1291
——Constant-current transformers on three-phase circuits, 1111
——Cooling by air-blast. By F. J. Teago, (D.) 1505
——Core-loss separation, Experimental investigation. By E. R. Shepard, *1154; Comment, 1134
——Design, Dimensioning the cross-section of yoke and selecting sheet iron. By M. Vidmaer, (D.) 54
——Efficiency of, of partial load. By Arthur Palme, (D.) 554
——Heating of. By O. Szilas, (D.) 104
——High-tension, with high reactance, British patent, (D.) 1404
——Iron losses. By J. Fischer-Hinnen, (D.) 330
——Line transformers, Experience with. By D. W. Roper, 1291
——Measuring transformers, Determination of magnetizing current. By E. Alberti and V. Vieweg, (D.) 724
——Measuring transformers, Operation of. By H. Gewecke, (D.) 887, 1115
——Mill service, Pittsburgh, *60
——Milliampere series transformer, 966. By E. Bennett, *1047
——Moloney, distributing, *1116
——Negative stray induction coefficients. By H. S. Hallo, (D.) 330
——Noises caused by charging lightning arrester, 1060
——Oil-cooled, Weiss patent, (D.) 1457
——Oscillation transformer for insulator tests. By S. Thomson, (D.) 386
——Outdoor substation, Delta-Star, *1065
——Parallel operation:
Calculation of current, the total current being resolved into its components by vector and symbolic analysis. By W. V. Lyon, *315; Comment, 294
Increasing output of group of transformers and a numerical problem to determine the current in each unit. By W. V. Lyon, 370
——Ratio, regulation and phase-angle. By Agnew and Silsbee, (D.) 274
——Salmon River Power Co., *1437
——Series-multiple, for street lighting and farm service, Kuhlman, *1272
——Small porcelain-clad, for residence use, Packard, *1007
——Testing, Westinghouse, *1273
——Theory of the general transformer in its relation to the ordinary transformer. By Karl Pichelmayer, (D.) 885
——Three-phase transformer connections from neutral point, *1180
——Three-phase systems, Discussions, 1292, 1293
——Transformation ratio of currents in the general transformer. By Niethammer and Siegel, (D.) 885; J. Sumec, (D.) 1404
——Triple harmonics. By R. C. Clinker, 1292
——Twenty-five-cycle, on sixty-cycle circuits, 329
Transmission of electric energy:
——Alternating-current distribution. By H. B. Gear, 539
——Artificial line, Design of, Harvard Institute of Technology, *980
——Big Creek development, *85; By A. J. Bowie, Jr., 493; D. P. Robinson, 493
——British Columbia Electric Railway Co., 951-ft. span, 713
——British practice in construction of high-tension lines. By B. Welbourn, (D.) 274
Transmission of electric energy: (Continued)
——"Buzzard short-circuits," Pennsylvania Water & Power Co., 314
——Calculation of lines. By J. Desplanques, (D.) 724
——Calculation and testing of long-distance lines. By Ulisse del Buono, (D.) 723
——Chicago Commonwealth Edison Co., *531
——Constant-current, direct-current series systems, Thury, in various part of Europe. By Louis Bell, *361; Comment, 350
——Cost-keeping methods on overhead construction, Milwaukee, Wis., 937
——Cost of line construction, Reducing, by use of combination primary-secondary distribution rack, *1256
——Cost of transmission lines, 986
——Cross-arms, Arrangement of lines on, 1498
——Cross-over construction near Denver, Colo., *993
——Current density of lines. By N. Forrsblad, (D.) 1063
——Discussions at American Institute of Electrical Engineers, 534
——Discussions at National Electric Light Association convention, 1313
——Exchange of surplus energy by means of tie line, Pacific Power Co., 364
——Extension of distribution lines, Formula. By H. G. D. Nutting, 322
——Extension of distribution lines, Wisconsin policies, 297
——French system, Compagnie Electrique de Franche-Comté. By A. Schoen and M. Charlet, (D.) 331
——Grounded systems, Service continuity in. Methods tried by Peninsular Power Co., Iron Mountain, Mich. By M. H. Collbohm, *870; Comment, 855
——High-tension line problems. By P. W. Sothman, 534
——Highest voltage, *85. By A. J. Bowie, Jr., 493; D. P. Robinson, 493
——Inductive interference:
Avoiding, Methods in France. By G. Girousse, *76
California investigations, 300
Plan for reducing, N. Y., N. H. & H. R. R., *984
——Inspection of overhead systems, 328
——Insulators, Ballast weight for. By H. W. Buck, *535; Comment, 518
——Interruptions by birds and animals, *271
——Keokuk-St. Louis lines, Operating record, *436
——Lehigh Navigation Electric Co., Hauto, Pa., Overhead construction, *1093
——Longest line in the world, *33, 71, 85. By D. P. Robinson, 493
——Lorain and Elyria, Ohio, *255
——Menominee (Mich.) & Marinette (Wis.) Light & Traction Co., *139; Comment, 127
——Milwaukee, Wis., Overhead construction, *937
——Ontario Hydro-Electric Power Commission, Interruption of service, 297
——Pole and tower lines. By R. D. Coombs, *1244
——Pole construction for use on curves, *439
——Poles on concrete bases, *1180
——Problems of high-tension lines, Comment on paper by P. W. Sothman, 574
——Progress in hydroelectric transmission in 1913. By Louis Bell, 15
——Protection of lines by ground wires. By W. Petersen, (D.) 218
——Public Service Electric Company of New Jersey, Overhead construction, *1329
——Relays for protection. By F. E. Ricketts, (D.) 945
——Report of National Electric Light Association committee on overhead construction, 1315
——St. Maurice-Lausanne, Switzerland, Direct-current, constant-current, Thury system; Comparison with the alternating-current, three-phase system for transmission purposes. By Louis Bell, *583; Comment, 575
——Salmon River Power Co., *1385, *1437
——Shooting transmission line clear of ice-laden branches, 604
——Southern interconnected high-tension systems, *1235; Comment, 1201
——Southern Sierras Power Co., 425-mile transmission project, California, 258
——Storm effects on the Atlantic coast, 520
——Surges, Examples of. By W. S. Franklin, *1046
——Surges in high-tension lines, Real and imaginary. By Felix Finckh, (D.) 105
——Switch tower, Construction of 11,000 volt, *1058
——Three-phase transmission. By A. Blondel, (D.) 723
——Tie-wires, Iron, on copper line, 553
——Top brackets, Iron-pipe, on 2200-volt line, *433
——Transformers, Three-phase for serving customers' motor installations, Milwaukee, 103
——Traveling waves, Protection against. By R. Ruedenberg, (D.) *1457
——Trumbull Public Service Co., Warren, Ohio, *199
——Voltage-limiting resolution of National Electric Light Association, 1315
——Worcester, Mass., Steel-tower line for factory use, *493
Transmission plants:
——Alabama Power Co., *1243
——Big Creek development, Pacific Light & Power Corporation, *33, *85; Comment, 1, 71; By A. J. Bowie, Jr., 493; D. P. Robinson, 493
——Bordeaux system, (D.) 274
——Carolina Power & Light Co., 1243
——Central Georgia Power Co., *1240
——Chattanooga & Tennessee River Power Co., *1238
——Columbus Power Co., *1239
——Constant-current, direct-current series systems, Thury, in various parts of Europe. By Louis Bell, *361; Comment, 350
——Georgia Railway & Power Co., *1239
——High-voltage plants of the world, in operation or under construction at voltages of 70,000 or more. Table giving details. By Selby Haar, 925; Supplement; Comment, 911
——Keokuk, Iowa, Operating record of transmission lines, *436
——Lewiston-Clarkston Improvement Co., Clarkston, Wash. Steam and hydro-electric system, *701; Comment, 681
——Public Service Electric Company, of New Jersey, Unified network transmission system, *1329; Comment, 1278
——St. Maurice-Lausanne, Switzerland. Direct-current, constant-current Thury system. Comparison with the alternating-current, three-phase system for transmission purposes. By Louis Bell, *583; Comment, 575
——Salmon River Power Co., *1385, *1437
——Southern interconnected high-tension systems, *1235; Comment, 1201
——Southern Power Co., *1241
——Tennessee Power Co., *1236
Trucks, Electric, Industrial:
——Baker brewery, *167
——Baker four-ton dumping, *225
——Behavior in New York's snowstorm, 408
——Buffalo Electric Vehicle Co., *726
——Commonwealth Edison Co., Repair wagons, *656
——Cotton-carrying, on Galveston piers, *1449
——Detroit, Mich., Dry-goods delivery, *712
——Developments of 1913. By W. P. Kennedy, 23
——Discussions at Boston convention of electrical interests, 1205
——Government service, *223
——Investments by private industry, 741
——Lord & Taylor delivery service, 820
——Moving van, Hebard, *822
——Municipal haulage, Advantages of electric vehicles, Chicago report, 45
——Operating cost compared with those of gasoline trucks. By E. J. Bartlett, 110
——Operation figures of line construction truck, Jackson, Mich., 822
——Post Office service:
Abroad, 242
Chicago, 804
Vienna, *764
——Sprinkler truck, *1271
——Store delivery methods, Study by Massachusetts Institute of Technology, 241
——Street sprinkling and cleaning machines, Mossay, *839
——Tower, Removable, for trolley repair work, *431
——Tractor, General Vehicle Co., *444
——Winter advice to users, 577
Trucks, Electric, Parcel-post service:
——Campaign of the Electric Vehicle Association co-operating with the National Electric Light Association, 690; Comment, 681
——Comparison of gasoline and electric cars. By J. V. Rockwell, 259
——Electric Vehicle Association of America, Work of, 1203
——Government's problem, 1200
——Indianapolis, Ind., Success in. Operating costs of gasoline and electric cars, *129
——New York City truck service, *76, 352
——Stern delivery wagon, *1510
——Success of, 69
Trusts and monopolies:
——Bills for anti-trust legislation, 237, 243, 856
——Chamber of Commerce committee on trust legislation, 460
——Congress should make haste slowly, 457
——Halt in the anti-trust legislation program, 747
——Hearings on trust legislation in Washington, 415, 460, 524, 574, 579, 693, 741, 1425, 1429
——Labor unions in trust laws, 1425
——Legislation in the Senate, 1378, 1473
——Legislation, retail prices and patents. By G. E. Tripp, 412; Comment, 407
——National government and business. By G. E. Tripp, 526
——New York Chamber of Commerce would postpone legislation, 744
——Plea for deliberation in legislation by business interests, 741
——President Wilson on trusts and monopolies, 183, 184, 237, 243, 295, 298
——President Wilson wants legislation pushed, 860
——Price-fixing on electrical devices, Testimony before Congressional committee, 524
——Psychology in business, 1425
——Suggestions regarding legislation. By W. H. Ellis, 915

*Indicates illustrated articles.

Trusts and monopolies: (Continued)
——Trust decisions and business. By W. E. Hotchkiss, 82
——Undue haste in legislation, 853
——(See also Public Service corporations.)
Tungsten.
——Coolidge patents on ductile, 77
——Electrical uses of, 383
——Fusing, British patent, (D.) 554
——Malleable, Canello patent, (D.) 722
——Reducing tungsten from brittle from ductile state. By R. W. Moore, (D.) 612
——Voigtländer patent, (D.) 1404
Turbine cleaner for fire-tube boilers, Lagonda, *1409
Turbines, Hydraulic, Selection of. By C. V. Seastone, 1312
Turbines, Steam:
——Developments of 1913. By W. F. Durand, 17
——Kerr multi-stage, *503
——Parsons, development, (D.) 164
——Versus gas engines for steel-mill power plants. By F. G. Gasche, 1032

U

Underground construction, Report of National Electric Light Association committee, *1314
Underwriters' Laboratories of Chicago, Label service. By A. R. Small, 806
Union Central Life Building (See Office buildings)
United Gas Improvement Company under government investigation, 744
United Shoe Machinery Co., Dissolution opposed, 1434

V

Vacuum cleaner, Electric Sterling, *1358
Vacuum tubes, Heating effects at the anode. By B. Hodgson, (D.) 219
Valuation (See Public service corporations)
Valves:
——Electrolytic, Rectifying effect. By G. Schulze and K. Lindemann, (D.) 724
——Gate valve for repacking under pressure, Walworth, 505
——Giles electric valve as protective apparatus. By G. Giles, (D.) 55
——Remote control, for high-pressure, fire-protection system in New York City, *608
Vehicle call, Electric, *1270
Ventilation of electrical machinery (See Generators)
Vermont Commission news 304, 641
Vibrating relay invented by K. Gulstad. By W. Judd, (D.) *777
Vibration electrometer. By H. Greinacher, (D.) *166
Vibrator, Electric, Lindstrom-Smith, *838
Voltage limitation in transmission lines, Resolution of National Electric Light Association, 1315
Voltage regulation law, Wisconsin, 267
Voltage regulation of alternators. By A. E. Clayton, (D.) 1112
Voltage regulation of rotary converters, British patent, (D) 330
Voltage regulator, Automatic, Thompson-McArthur, *111
Voltameter, Silver. By E. B. Rose, G. W. Vinal and A. S. McDaniel, 373; Comment, 350; (D.) 332
Voltmeters, Electrostatic:
——Penkert. By I. Schaffit, (D.) *1001
——Szilard, (D.) *333
Voting, Electrical apparatus for, 631
Vulcanizer for automobile tires, Shaler, Electric, 891

W

Wagons (See Trucks)
Washing machines, Electric:
——Aurora vacuum, *1410
——Automatic Electric Washer Co., *948
——Capital Electric Co., *892
——Dodge & Zuill, *1006
——Horton, *281
——Judd reciprocating, *1006
——Michigan, *780, *840
Washington Commission news, 919
Water, Magnetic susceptibility. By H. C. Hayes, (D.) 1114
Water heater, Electric, for car washing, Cincinnati, 215
Water pipes (See Thawing water pipes)
Water power (See Hydroelectric developments)
Water purifier, Home-made, East Liverpool, Ohio, *51
Water rheostat mechanism for operating induction motor, *832
Water tank with illuminated float gage, *1180
Watt-hour meters:
——Checking method. By R. S. Brown, *144; Comment, 127
——Sangamo mercury-motor, *445
——Single-phase induction, General Electric, *1460
——Westinghouse, *1185
Wattmeters:
——Changing range of power indication. 884
——Checking polyphase, where power-factor is uncertain. By P. Ackerman, *145; Comment, 127
Waves, Electric:
——Deformation of, traveling along conductors. By W. O. Schumann, (D.) 1182
——Formation, reflection and speed of propagation. By Ludwig Binder, (D.) 554, 611
Welding, Electric:
——Arc welding. By E. S. Zuck, (D.) 387
——Drill construction, Dulles-Baldwin Electric Drill Co., *890
——Modern methods. By T. T. Heaton, (D.) 1354
——Utilization of carbon arc and metallic arc to bring metals to melting temperature. Welding methods and their application. By O. A. Kenyon. *705; Comment, 683
——Westinghouse arc welding outfit, *1004
West Virginia Commission news, 806, 1434
Western Association of Electrical Inspectors, Annual meeting, 128, 245, 303
Western Red Cedar Association, Annual meeting, 185
Western Union Telegraph Co., Prospects of, 802
Westinghouse Electric & Mfg. Co.:
——Annual report 1139, 1197
——Strike, 1376, 1430
Westinghouse, George:
——Biographical sketch, *634; Comment, 629
——Memorial to, in Washington, D. C., 684
——Tributes of former associates, 637
Wet filtration of cooling air for electrical machinery. By D. A. Hackett, (D.) 775; Comment, 743
Wheatstone bridge:
——Dial-type laboratory, Leeds & Northrup, *170
——Finding values of currents and voltages. By R. Newman, (D.) 386
Wilson, President, Message, 183, 184, 237, 243, 295, 298
Winding diagrams, Zigzag. By H. MacCallum, (D.) 163
Winding machines, Status of, in Europe. By W. Phillippi, (D.) 1113, 1182
Wire reel, *1508
Wireless telegraphy (See Radiotelegraphy)
Wireless telephony (See Radiotelephony)
Wires, wiring and conduits:
——Alternating-current line calculations. By H. B. Dwight, (D.) 1183
——Aluminum cables. By E. V. Pannell, *1117
——Balancing of cables for deep shaft hoists, *884
——British wiring rules. By F. Broadbent, (D.) 219
——Cable costs. By J. B. Sparks, (D.) 611
——Charts showing sizes of conduits for wires and cables, *323
——Cheap wiring schemes in various European cities. Electricity furnished to poorest inhabitants. By S. E. Doane, *1157; Comment, 1133; Supplement
——Conduit threader, *281
——Elasticity of copper wire and passage of a current. By H. L. Dodge, (D.) 219
——European cities, Inexpensive methods in. By S. E. Doane, *1157; *1175
——Faults in cable:
Localizing faults, (D.) 333
Locating apparatus, Matthews, *891
——Fireproofing cables, *943
——Fishing conductors in ceilings laid on furring strips. By George Blackman, *380
——Fixing conductors to insulators. By Dethiollaz, (D.) 331
——German rules, (D.) 275, 1000, 1354
——Handling heavy cables while plant is rebuilt, *52
——Loses in metallic conduits, 273
——Manufacture and testing of insulated wire and cable. By H. A. Marss, 1056
——Manufacture of impregnated cables. By E. Masson, (D.) 1406
——Minneapolis wiring ordinance, 785
——Network calculations. By Karl Fuchs, (D.) 1183
——New York requirements for switchboard wiring, 354
——Outlets on a branch circuit, Allowable, 721
——Overhead wiring, Report of Western Association of Electrical Inspectors, 245
——Protection of installations, Report of the German Association, (D.) 498
——Sag-temperature relations in suspended conductors. Calculating methods. By H. M. Hall, 203; Comment, 182
——Spacing distances. By Gino Rebore, (D.) 611
——Standardization rules, 1078
——Steel-taped cable installations, Cost, 829
——Tables of wire sizes and starting fuses for induction motors, 378
——Variation of inductance with size of conductor, 1352
——Western Association of Electrical Inspectors, Discussion, 303
——Why the electric current passes through the interior of a wire. By J. Fischer-Hinnen, (D.) 165
Wisconsin Electrical Association:
——Annual convention, 191; Comment, 181
——Co-operation of Railroad Commission, 181
Wisconsin Electrical Contractors' Association:
——April meeting, 896
——January convention, 189; Comment, 181
Wisconsin Railroad Commission:
——Attack by Minnesota Home Rule League, 1373
——News 137, 195, 246, 415, 473, 698, 807, 865, 919, 975, 1033, 1143, 1483
Woodworking (See Industrial plants)
Workmen's compensation (See Employees)

AUTHOR INDEX

ACKERMAN, P. Checking polyphase watt-meter connections where power-factor is uncertain, *145
Anderson, A. E. Preventing waste of excess exhaust steam, *941
Arnold, B. I. Railroad electrification, 27
Arnold, T. H. Concrete pole butts, *491

BACHMAN, R. A. The Edison battery, 158
Barstow, W. S. Comment on President Wilson's message, 298
Baylor, A. K. Influence of the holding company on electric utilities, 9
Bell, Louis. Hydroelectric transmission systems, 15
——Recent developments in constant-current transmission, *361
——Transmission plant without a switchboard, *583
Blackman, George. Fishing conductors in ceilings, *380
Bowie, A. J., Jr. The highest voltage, 493
Brown, R. S. Checking watt-hour meter connections, *144
Burr, F. D. Denver's electric bakery, *544

CLAYPOOLE, WALTER. Design of high-tension porcelain insulators, *872
Collbohm, M. H. Service continuity in grounded transmission systems, *870
Coombs, R. D. Pole and tower transmission lines, *1244
Cooper, H. S. Conflicting dates of society meetings, 213
——Rates for electric service, 326
Cooper, M. D. Economic design of a distributing system, 546
Cravath, J. R. Daylight and artificial light, 49
——Some present street-lighting problems, 1055
Crocker, F. B. Boundaries and divisions of standardization, 716

DENNIS, B. W. Quick-firing arrangement of boilers to relay waterpower, 212
Dey, H. E. Differential relay for heavy work, *1260
Doane, S. E. Handling the small consumer in Europe, *1157
Doggett, L. A. Calculations for alternating current coils, *259
Dompieri, Gino. Compulsory registration of engineers, 435
Dorsey, H. G. Automatic fuse-testing machine, *1348
Douglas, J. B. Accident prevention in power plants, *101
Dow, J. S., and V. H. Mackinney. Shadows of natural and artificial light, *825
Durand, W. F. Developments in prime movers, 16
Dwight, H. B. Economies of power-factor adjustment, *708

EIDLITZ, C. L. Competition between dealer, contractor and central station, 450
Erickson, Halford. Reasonable return, 1477

FARWELL, F. M. Combined synchronous and induction motor loads, 269
Fee, H. A. Ozone machines and public health, 324
Franklin, M. W. Ozone machines and public health, 381
Freeman, W. W. Relative stability of public utility financing, 11

*Indicates illustrated articles.

GAGE, E. G. Application of polyphase currents to radiotelegraphy, *1042
Gebelein, J. P. Meters on unbalanced circuits, 606

HAAR, SELBY. High-voltage transmission systems of the world, 925
Hale, R. S. System of charges for energy, 1156
Hall, H. M. Sag-temperature relations in suspended conductors, 203
Haller, Arthur. Standard sizes of catalogs, 494
Halliday, F. W. "Electric" school building of Rupert, Idaho, *1151
Harrison, Haydn. London's electric energy supply, 1390
Hemming, Emile. Classification and characterization of molded insulations, *761, *813
Herr, E. M. Tribute to George Westinghouse, 639
Hertner, J. H. Low-priced electric vehicle, 435
Hettinger, J. Resonance in radiotelegraphy, *420, *481
Hewitt, Peter Cooper. Tribute to George Westinghouse, 637
Hoeffleur, A., and M. P. Misslin. Adjustable-speed polyphase induction motor, *1247
Hogan, J. L., Jr. Radio service on the Lackawanna Railroad, *89
——Radio-telegraphy and telephony, 20
Homan, J. G. Sheet-steel economy in magnetic circuits, 606
Huber-Stockar, Emil. Electrification of Swiss Federal Railways, 689
Hunter, John. Boilers arranged for quick firing, 494
Hyde, E. P. Progress in the science of lighting, 745

INGERSOLL, L. R. Measuring the glare from paper, *645
Insull, Samuel. Centralization of power supply, 917

JACKSON, H. D. Rates for electricity, 659
Jackson, J. G. Reinforced-concrete poles as cheap as wood, *147
Jackson, W. D. Water-power situation, 13
Jacquin, Charles. Booster-control test on Metropolitan Railway, Paris, *312
Jansky, C. M. Rates for electric service, 771

KENNEDY, S. M. Attitude of conciliation, 939
——Building a load-factor on an electric system, *424
——Removing obstructions to business, *877
Kennedy, W. P. Electric-vehicle progress during 1913. By W. P. Kennedy, 23
Kennelly, A. E. Applied electrical science in 1913, 6
Kent, A. V. Cost figure from Brookings, S. D., 434
Kenyon, O. A. Electric arc welding, *705
Knowles, E. R. The nitrogen-filled lamp, 549
Koester, Frank. Co-operative electrical farming, 607

LANPHIER, R. C. Ampere-hour meter and storage battery, 213
Lee, Barrett. An alliance for learning, 270
Lee, C. K. Fireproof electrical devices, 434
Leighton, M. O. Waterpower developments in public lands, 1156
Leonard, H. W. Comment on President Wilson's message, 298
Leslie, E. A. Motor-driven raw-water ice factory in Brooklyn, *1485
Lighthipe, J. A. Power-bond election in Los Angeles, 1501
Long, J. M. Co-operation essential in conciliation, 1259
Luckiesh, M. Color effects for advertising and the stage, *759
——Heterochromatic photometry, 1105
Lyndon, Lamar. Edison battery, 381
——Storage-battery industry, 21
Lyon, W. V. Parallel operation of transformers, *315, 370

McCARTER, T. N. Future of public utilities, 864
McClellan, William. Consulting engineers and manufacturers, 717
Macdonald, J. E. Power-bond election in Los Angeles, 1502
McFarland, W. M. Tribute to George Westinghouse, 638
Martin, T. C. Electrical industrial growth in 1913, 4
Matthews, W. N. Comment on President Wilson's message, 298
Maxim, H. P. For a chain of amateur wireless stations, 1057
Mendenhall, B. W. The nitrogen-filled lamp, 549
Meyer, G. W. Combined synchronous and induction motor loads, 381
——Economics of power-factor adjustment, 1259
Millar, P. S. Improvements in lamps and lighting, 18
Miller, A. S. Public service corporations and the public, 14
Milton, T. Storage-battery load regulation, 1400
Misslin, M. P. (See Hoeffleur, A.)
Montague, G. H. Discrimination in prices, 1108
Moses, P. R. Electric service, energy and charges, 324

NUTTING, P. G. Determination of glare, 1156

O'DAY, A. B. (See Powell, A. L.)
Osborne, L. A. Electrification of trunk lines, 159
Overbeck, H. G. The low-priced electric vehicle, 882

PANNELL, E. V. Insulated cables of aluminum, *1117
Parker, J. C. Conserving initiative, 994
Powell, A. L., and A. B. Oday. Lighting of an outdoor tennis court with high-efficiency lamps, *1398
Purcell, J. M. Richmond's development of a historic water-power, *867

REISINGER, HUGO. Comment on President Wilson's message, 298
Rice, C. W. Tribute to George Westinghouse, 637
Robinson, D. P. World's longest transmission line, 493
Rockwell, T. V. Electric trucks for parcel post service, 269
Roeber, E. F. Economics and esthetics, 910
——Electrochemistry in 1913, 22
Rosa, E. B. G. W. Vinal and A. D. McDaniel. The silver voltameter, 373

SCATTERGOOD, E. F. Power bond election in Los Angeles, 1258
Schoepf, T. H. Characteristics of saturated and unsaturated vehicle motors, *692
Schroeter, J. P. A paint that warns of overheated bearings, 833
Seabrook, A. H. Systems of charges for energy, 1454
Shepard, E. R. Transformer core-loss separation, *1154
Skelly, J. J. Cable burn-out caused by mice, *268
Skinner, H. H. Low-priced electric cars, 882
Smith, W. A. Electric service rates, 658
Soreng, E. M. Cost figure from Brookings, S. D., 434
Stanley, William. Tribute to George Westinghouse, 637
Steffner, Frank. Low-priced electric cars, 1108
Stempel, W. M. Charges for electrical energy, 1400
Still, Alfred. Commutation, *1442, *1489
Stillwell, L. B. Tribute to George Westinghouse, 638
Strohm, R. T. Advantages and disadvantages of oil fuel, 551
——Combustion of oil fuel, 272
——Grease in condensers, *1110
——Losses by leakage of steam, 1402
——Management of oil-fuel plants, 437
——Purchase of oil fuel, *660, *720
Sullivan, J. J. Comment on President Wilson's message, 298
Sweet, H. B. What the service will bear, 325

TAYLOR, A. M. High-frequency alternator, 158
Taylor, J. B. "Longitudinal" and "transverse" induction phenomena, 772
Terry, C. A. Tribute to George Westinghouse, 638
Tesla, Nikola. Tribute to George Westinghouse, 637
Thomson, Elihu. In memoriam—Prof. Edwin J. Houston, 523.
Tomlinson, L. C. Systems of charges for energy, 830
Tripp, G. E. National government and business, 526
——Trust legislation, retail prices and patents, 412

UNDERHILL, C. R. Characteristics of alternating-current electromagnets, *981

VAIL, T. N. Regulation from the telephone viewpoint, 7

WAKEMAN, J. M. Public service corporations and the public, 212
Walker, S. F. Calculating the size of a refrigerating outfit, 764
——Cold storage of food-stuffs, 878
——Electric refrigeration in the florist's shop, 823
Waring, T. D. Resistivity on trial, 1350
Wells, F. C. The new learning, 1057
Wendell, C. E. Electric service, energy and charges, 99
Whitten, R. H. Risk and public service control, 8
Williams, Arthur. Comment on President Wilson's message, 298
Williams, R. D. Central stations and public good will, 50
Winslow, W. H. Rate making for central stations, 12

*Indicates illustrated articles.